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Grade III. ..	756,859 (31–32%) ..	181,902 (7·5%)
Grade IV. ..	250,280 (10%) ..	60,647 (2·5%)

In other words out of every 9 men called up 3 were placed in Grade I., 2 in Grade II., 3 in Grade III., and 1 in Grade IV., a figure sadly below what might be expected from a healthy nation. This is seen when comparison is made with Keith's standard, which is based on the law worked out in regard to other human measurements by Karl Pearson and his pupils. Instead of every 1000 men examined yielding on the average 700 Grade I., 200 Grade II., 75 Grade III., and 25 Grade IV., the actual yield is 359 Grade I., 226 Grade II., 312 Grade III., and 103 Grade IV. The position may be summarised by saying that in round numbers our physical census showed a shortage of 825,000 Grade I. men, an excess of 61,000 Grade II. men, and the alarming excess of no less than 575,000 Grade III. men, and 190,000 Grade IV. men.

When dealing only with the youths of 18 it might be expected that the proportion of fit, and consequently the index of fitness, would be considerably higher. Instead of this it was found among the youths who became 18 years of age during 1918 that there was: (*a*) A deficit of nearly 13,000 Grade I. youths among the 260,000 examined; (*b*) an excess of over 6000 Grade IV. youths, or, in other words, almost double the number of youths "totally and permanently unfit for any form of military service" which there should have been, judging by Keith's standard.

CAUSES OF DEFICIENCY.

As the official report says, "Such a conclusion can only be regarded as exceedingly disquieting, and in itself throws a lurid light upon the effects of our civilisation upon the adolescent population." The chief causes given for this deficiency were: (1) Poor physique and presence of physical defects; (2) tuberculosis; (3) diseases and degeneration of the heart and blood-vessels, in many cases due to various infective conditions.

With regard to the first group, a considerable amount was due to preventable conditions in early life such as dietetic errors. Apart from these, however, a very important cause of defects of physique and of degeneration was the effect of occupation on workers. I quote from a lecture by Sir James Galloway [4]:—

"One of the most striking features of the report of grading in the industrial districts is the rapid fall of the numbers of young men who could be placed in Grade I. at the age of 18 years compared to the numbers who could be placed in the same grade on being examined four or five years later."

This remark applied particularly to the young workers in the textile industries, both in cotton and wool. A medical officer in regard to the south-eastern areas of Lancashire noted that the average man there was for military purposes an old man before he reached the age of 40. Of 200 youths of 18 to 20 years of age examined and rejected in the north-western region of England no fewer than 85 were rejected on account of poor physique.

The second great cause, as I have stated, was tuberculosis. In London 3·1 per cent. of 160,545 examinations made were placed in Grades III. and IV., 2·6 being for tuberculosis of the lungs. As the result of 66,000 examinations made in Liverpool from Nov. 1st, 1917, to Jan. 31st, 1918, which were carried out in close association with the medical officer of health and his officials, about 1·75 per cent. were rejected on account of tuberculosis, the striking fact emerging that of 277 cases proved to be tuberculous 218, or 78 per cent., were previously unknown to the health authorities.

The third great cause noted was disease and degeneration of the heart and blood-vessels. Included in this category are the various forms of heart disease due to rheumatic inflammation of the heart. On these I do not dwell except perhaps to point out that I hope to show efficient respiration to be of great value in aiding to preserve the physical efficiency of such cases. On the other hand, one of the most important forms of circulatory troubles was venous varix in some form. The amount of this was surprising even to experienced medical men, especially in industrial districts and among older men. Varicosity of the veins of the lower extremities to an extent sufficient to disable or be dangerous was found to be very common. It may be pointed out that such diseases are largely associated with deficiency of the respiratory mechanism.

* Lectures II. and III. will be published in subsequent issues of THE LANCET.

RESPIRATORY EFFICIENCY CONDITIONED BY HYGIENE AND SANITATION.

These figures show that the causes of physical inefficiency are to a large extent preventable. I do not wish to enter largely into details of sanitation and hygiene—as, for example, to point out the effects of insufficient or ill-chosen diets, overcrowding, back-to-back houses, and ill-ventilated workshops—but I cannot refrain from pointing out that, apart from the very important question of diet, these evils lead to a condition of respiratory and circulatory inefficiency largely involving the well-being of the individual. From this statement it will be seen that I attach great importance to the respiratory efficiency of the individual in the acquisition and preservation of physical efficiency. In particular is this the case in regard to bodily endurance. I have been led to this view by my work in connexion with the Royal Air Force. It has been my privilege to study the causes which lead to flying fatigue, and also to endeavour to study the bodily qualifications which must be sought for in the successful airman. To do this satisfactorily it was necessary in the first place to examine successful flying officers, as well as those suffering from various degrees of breakdown. As the results of investigations, with which I shall deal later, it became apparent that for efficiency in air work and for the prevention of physical endurance of the stress of flying respiratory efficiency was of particular importance. As the result of the examination of many hundred candidates for the Royal Air Force it has also become obvious that the same condition applies to all physical efficiency and bodily endurance, whether it be for air work or for work on the ground.

PRESENT KNOWLEDGE CONCERNING RESPIRATORY FUNCTION.

Before dealing in detail, however, with the results obtained in connexion with this work it is necessary to review the present state of our knowledge regarding the processes of respiration, since I believe that a considerable amount of the respiratory inefficiency of the present day may be attributed to the fact that the true significance of the mechanism of respiration is not correctly appreciated, and therefore that the fundamental physiological principles of respiration are not correctly taught and applied.

Broadly speaking, movements concerned in respiration are designed to serve three functions: (1) to provide the body with oxygen and to rid it of carbon dioxide; (2) to act as accessory pumps to the circulation, thereby aiding, particularly in the upright posture, the return of blood to the heart; (3) to massage the alimentary tract, thereby helping to preserve the muscle tone of stomach and intestines.

With regard to the movements of respiration, it is not proposed here to enter into the time-worn controversy as to the exact action of the various muscles engaged in the respiratory processes, nor as to exact movements performed by individual ribs. Too much time has already been wasted by hypothecating such actions and movements from minute considerations of the dead structures. There is a great difference between the living and the dead thorax. It is better for ordinary purposes to consider the movements of the thorax as a whole. Although the muscles concerned in respiration are so arranged that they can be coördinated in various ways to bring about the processes of inspiration and expiration, there is, undoubtedly, a most efficient way for each process, and for bodily efficiency and endurance it is important that this way be employed. The essential movements of quiet inspiration are the descent of the diaphragm and the raising of the lower ribs. When inspiration is deeper the movement spreads progressively in undulatory fashion from the lower to the upper ribs, so that the upper part of the chest is seen to rise. This upper chest movement is to be regarded as the accessory part of inspiration. On this account it becomes particularly prominent when breathing is greatly increased in depth by excessive exercise, or becomes laboured in disease, or when correct inspiration is impeded by occupation or clothing.

CLOTHING AND RESPIRATION OF WOMEN.

It may be argued that costal breathing is the normal type of breathing for women. This should not be the case when the clothing is properly adjusted. This does not mean that costal breathing is altogether due to wrong clothing. It is probable that women normally employ the costal element to a larger extent than men—since, as suggested by John Hutchinson, it forms the accessory mechanism for efficient quiet respiration during pregnancy. That such breathing, however, is in large part due to clothing is shown by the fact that in cases of complete hypospadias which have been wrongly regarded as females and clothed as such, the type of breathing has been observed to be what may be termed female in character, although the subjects were in reality males. It would be a mistake to teach that costal breathing alone is normal for the female. Young girls and women should be taught that correct inspiration is always associated with good diaphragmatic action, and that the upper costal element, however large it tends to be, should be regarded as the accessory element. The clothing of women, therefore, should be adapted to give free abdominal movement. I have not had sufficient opportunity to study widely what may be termed normal female breathing, but at a school of physical training I noticed that abdominal breathing was present.† As regards the male, however, it must be emphatically asserted that the time has come to abandon the idea that by striving after a large upper chest expansion the respiratory capacity is greatly increased. In this type of breathing the pit of the stomach is usually observed to move inwards instead of outwards during the inspiratory process, while expiration is accompanied by an outward movement in this region. Many observers have already noticed that this type of respiration is less efficient. In reality the vital capacity in such type of breathing is considerably less.

MEASUREMENT OF UPPER AND LOWER CHEST EXPANSION.

Radiographic evidence has also shown that in such breathing the diaphragm moves little if at all; indeed, in extreme cases the abdominal contents pass farther up into the thorax, so that in reality the apparently increased lung capacity consists of the pushing of the abdominal contents higher into the thorax. Although prevalent at one time in the army, this type of breathing has now been abandoned; possibly it attained a vogue owing to the frequency with which phthisis is found to attack the apex of the lung. As shown later, however, upper costal breathing is adequate only for the expansion of the anterior part of the upper lobes; the efficient expansion of the apex of the lung is largely dependent upon efficient diaphragmatic and lower costal breathing. As a guide to respiratory efficiency the measurement of upper chest expansion should be abolished or at least combined with a measurement of the increased size of the chest at the level of the lower ribs. This latter is the more important measurement. On deep inspiration there should be a movement out of the pit of the stomach, together with considerable expansion of the lower part of the chest. Correct inspiration, therefore, consists of the contraction of the diaphragm, attended generally by an upward movement of the lower ribs, full inspiration being attained by a wave-like movement which passes to the upper ribs. Observation shows that it is the type prevalent in individuals who possess the greatest bodily endurance. By its means the greatest respiratory capacity is attained, and by its means alone is the lung adequately expanded in all its parts.

† Dr. Mina Dobbie, medical officer to the South-Western Polytechnic School of Physical Training, tells me that she attaches considerable importance to the increase of the abdominal measurement during inspiration over that during expiration as a sign of progress in efficiency. Her records certainly bear out this contention.

CORRECT EXPIRATION.

Just as correct inspiration is important so also is correct expiration. If inspiration be correctly coördinated, correct expiration naturally follows; this consists of a contraction of the abdominal muscles, especially those of the upper part of the abdomen, together with a reposition of the ribs by virtue of muscular action. The fact that expiration is a muscular act must be emphasised. Inspiration and expiration are due to the coördinated action of groups of antagonistic muscles. When the leg is flexed, as Prof. Sherrington has shown, both the antagonistic flexors and extensors come into action in order to produce a finely coördinated movement. So in the respiratory movements the muscles of inspiration and expiration are antagonistically concerned. In inspiration, the inspiratory muscles in coördinated fashion overcome the expiratory; in expiration the expiratory overcome the inspiratory. From the beginning to the end of the movement each muscle concerned is balanced, steadied, and controlled by the action of its antagonist.

Reference to text-books of physiology show that in general the act of quiet expiration is regarded as a non-muscular act due to elastic recoil of the expanded lung and the return of the chest by its own weight. This view is undoubtedly based upon the classical work of Dr. Hutchinson[5] published in 1835, and, as Prof. Keith points out, is based upon an error of observation. Michael Foster,[6] in his text-book, writes as follows:—

> "In normal easy breathing expiration is in the main a simple effect of elastic reaction. By the inspiratory effort the elastic tissue of the lungs is put on the stretch, so long as the inspiratory muscles continue contracting, the tissue remains stretched, but directly the muscles relax the elasticity of the lungs comes into play and drives out a portion of the air contained in them. Similarly, the elastic sternum and costal cartilage are by the elevation of the ribs put on the stretch, they are driven into a position unnatural to them. When the intercostal and other elevator muscles cease to contract the elasticity of the sternum and costal cartilage causes them to return to their previous position, thus depressing the ribs and diminishing the dimensions of the chest. When the diaphragm descends, in pushing down the abdominal viscera, it puts the abdominal wall on the stretch, and hence when at the end of inspiration the diaphragm relaxes the abdominal walls return to their place, and by pressing on the abdominal viscera push the diaphragm up again into its position of rest. Expiration, then, is in the main simple elastic reaction, but there is probably some, though possibly in most cases a very slight, expenditure of muscular energy to bring the chest more rapidly to its former condition. This is, as we have seen, supposed by many to be afforded by the internal intercostals acting as depressors of the ribs. If these do not act in this way we may suppose that the elastic return of the abdominal walls is accompanied and assisted by a contraction of the abdominal muscles."

It will be seen that active expiration is allowed to be a supposition. Evidence will be adduced later to show that it should be regarded as a necessity, if properly coördinated efficient expiration is to take place.

THORACIC ANATOMY: EXTENSIBILITY OF THE LUNG.

To understand properly the movements concerned in the processes of inspiration and expiration, certain anatomical details in regard to the bony framework and the musculature of the thorax have to be considered. The varying extensibility of different parts of the lung has also to be borne in mind.[7] In the act of inspiration, owing to the varying degree of extensibility of the different structures of the lung, the organ expands in the manner of a Japanese fan—least in the neighbourhood of the great vessels and bronchi (the root of the lung), most in the outermost zone just beneath the pleuræ (subpleural zone). The infundibula are the essential distensible elements of the lungs. They vary in size in these different zones of the lung, being largest in the subpleural zone and smallest at the root of the lung (Fig. 1). The distensibility of any part of the lung depends upon the number and size of the infundibula in that part. The lungs do not expand equally in all directions; the two surfaces which are most expanded are the diaphragmatic and the sterno-costal, or ventro-lateral. In general, the apical surfaces remain almost stationary. It is only when the lungs are well ventilated that the parts most remote from these surfaces of direct expansion are brought properly into action. In people of sedentary habits, therefore, such parts of the lung tend to fall into a condition of disuse, and receive a poor supply of blood, with its

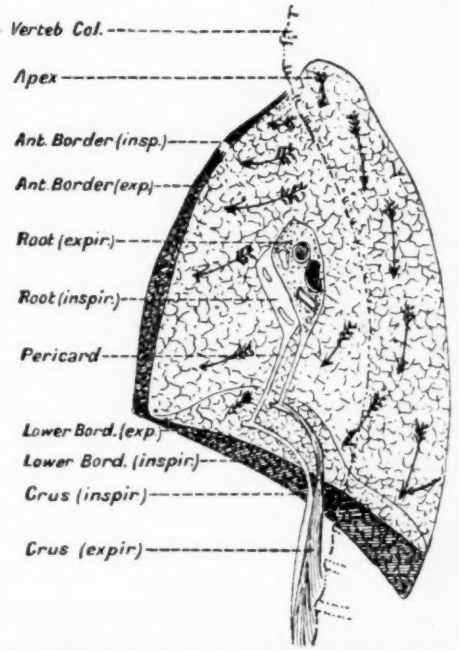

FIG. 1.—Mediastinal aspect of right lung to show respiratory movement of the root (Keith). The crus of the diaphragm is also indicated, and its attachment to the root of the lung through the pericardium. Arrows indicate direction of inspiratory movement of various parts of the lung.

immunising properties. This, as Keith suggests, explains why phthisis so frequently first attacks the apex of the lungs.[8] The great fissure of the lung is of functional significance in providing for the adequate expansion of the lung in all its parts.

In the inspiratory movement the thorax is, or should be, expanded by the movement of the diaphragm and by the movements of the ribs and rib cartilages. There has been considerable speculation as to the exact nature of the movements performed by the diaphragm. The view commonly expressed is that this muscle, by its contraction, in association with muscles which fix the thorax, opens up the angle which it forms with the thoracic wall, thereby enabling the lung to expand in a downward direction. In such a movement the central tendinous portion is supposed not to participate. After contraction, it is assumed that the diaphragm passively returns to the position of rest. Recent study of the diaphragmatic movement by means of the X rays has shown, however, that there is a forward downward movement of the whole diaphragm, accompanied by a definite movement of the abdominal viscera.

The diaphragm may be regarded as consisting of two parts: (1) the spinal or crural, from the spinal column and arcuate ligaments to the back portion of the central tendon; and (2) the costo-sternal, or anterior, attached to the front and sides of the central tendon, and arising by several digitations from the ribs. The arch of the diaphragm rests upon, and is supported equally by, the abdominal viscera, and is at the same time kept constantly applied at the

circumference to the inner wall of the thorax by the negative intrathoracic pressure. Thus, when its two parts contract it acts like a true piston, moving in a forward and downward direction. The lungs, including their roots, follow this movement, which therefore tends to bring about expansion throughout the whole lung, including the apex, which would otherwise be ill-expanded. In quiet, normal breathing the amount of movement of the right dome is about half an inch, that of the left dome and of the central tendon somewhat less.

MOVEMENTS OF THE RIBS.

In general, two movements of the ribs have been recognised as taking place in inspiration—namely, (1) round an axis corresponding to the spinal articulation, increasing the back-to-front diameter of the thorax; (2) round an axis corresponding to the spino-sternal articulation, increasing the diameter from side to side. Owing to the variation in size, shape, inclination, and articulation of the ribs, such an explanation, while essentially true in a general sense, is imperfect. It is better, as Keith does, to divide the ribs into two sets: (1) the upper, the second rib to the fifth; (2) the lower, the sixth rib to the tenth. These two sets differ in their musculature, in the nature of their articulation and ligaments, in their shape and arrangement, and in their movements. The first rib is not looked upon as one of the costal series; together with the manubrium sterni it forms an operculum to the chest and performs a special movement of its own. The lowest two ribs, inasmuch as they are unattached in front, are essentially a part of the abdominal wall. It is on the movement of the upper ribs (second to fifth) that most of the observations upon rib movements and the action of the intercostal muscles have been made. The following view has been put forward by Keith as to the mode of action of the intercostal muscles. The purpose of the upper rib movement is the expansion of the upper lobe of the lung, particularly in its anterior part. When concerned in inspiration both sets of intercostal muscles act together, and draw up the upper ribs towards the operculum, which acts as a fulcrum. During the succeeding expiration the lower set of ribs are fixed and act as a fulcrum, the upper set being drawn down towards them by the intercostal muscles. There is some experimental evidence to show that the external intercostal muscles act during inspiration. The fibres slant from above downwards and forwards, and shortening, raise the ribs. The fibres of the internal intercostals, on the other hand, slant from above downwards and backwards, and shortening, lower the ribs. The two, acting together, make rigid the thoracic wall. The intercartilaginous fibres act with the external intercostals. The purpose of the movement of the lower ribs is primarily to expand the lower lobe of the lung. In this action the diaphragm is intimately concerned, aided by the ilio-costalis, and the action of the external intercostal and the interchondral muscles. The antagonistic muscles are the external oblique, the internal oblique, and the transversalis. During inspiration, owing to the mode of articulation of the ribs, the lateral and anterior part of each moves outwards more than the one above. At the same time, the lower ribs are raised, together with the sternum, so that the net result of the lower rib movement is to increase the transverse and back-to-front diameter of the lower thorax, and with the diaphragm moving downwards, the vertical diameter of the whole cavity.

The first pair of ribs and the manubrium sterni are intimately bound together and form a lid or operculum to the thorax. This lid is articulated behind with the spinal column, in front with the body of the sternum, the manubrio-sternal joint (Fig. 2). During inspiration there is a slight upward movement of the lid, allowed by the manubrio-sternal joint, which causes an expansion of the anterior part of the apex to the lungs. This movement is particularly marked in the thoracic type of breathing. In persons with ill-developed chests there is but little movement here. The posterior part of the apex of the lung is but little affected by the movement of the operculum, its expansion being secured by diaphragmatic breathing. Inspiration is, therefore, a very complex act,

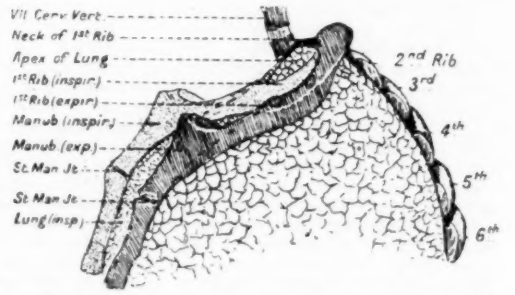

FIG. 2.—Diagram to show respiratory movements of the first pair of ribs and manubrium sterni, and the effect of these movements on the expansion of the apex of the lung (Keith).

and it is owing to the complicated nature of the movements concerned that the lungs are divided into lobes. The upper ribs are chiefly concerned in the expansion of the upper lobes, the lower ribs in the expansion of the lower lobes, the diaphragm promoting the expansion of the whole lung. As already stated, expiration is controlled by muscular action; generally speaking, the extensibility and elasticity of the thorax are to be regarded as factors in producing expansion or compression of the lung only when the ribs pass into extreme inspiratory or expiratory positions.

MECHANISM OF CIRCULATION.

The mechanism of the circulation has been so contrived that it remains constant and efficient, not only in the horizontal position, but also when the living animal is ceaselessly shifting the position of his body. The hydrostatic influence of gravity had a most important bearing on the evolution of the mechanisms which control the circulation. In the upright posture the blood under the influence of gravity continually presses downwards, and would sink if the veins and capillaries of the lower parts were sufficiently extensile to contain it and there were no mechanisms to counteract the effect of gravity.[9] [10] Such is actually the case in the snake or eel; in them, as Leonard Hill has shown, the heart empties so soon as they are immobilised in the vertical posture. This does not occur if the snake or eel be immersed in water, since the hydrostatic pressure of the column of water outside them balances that of the blood within. During the evolution of man there have been developed special mechanisms by which the sagging of the blood to the lower parts is prevented and the assumption of the erect posture rendered possible. In fishes, amphibia, and reptiles there are venous valves for preventing regurgitation of the blood from the sinus venosus into the great veins. In the warm-blooded vertebrates, with the appearance of the diaphragm and the fusion of the sinus venosus with the right auricle, a venous cistern formed by the superior and inferior venæ cavæ and by the innominate, iliac, hepatic, and renal veins, takes the place of the sinus venosus. Six pairs of valves prevent regurgitation from this cistern—namely, those placed in the common femoral, the subclavian, and jugular veins (Fig. 3). The cistern, when filled, may hold some 400 c.cm. of blood. In the liver there may be some 500 c.cm. of blood. This can be expressed into the cistern by abdominal pressure. The portal venous system, when distended, may hold another 500 c.cm., which can be expressed through the portal veins and the liver into the cistern. There is thus a large volume of blood for the heart to draw upon during diastole, and this may be of particular value during the performance of a great

muscular effort. Although the aspirating action of the thorax tends to suck this blood into the heart in the upright posture, it is the descent of the diaphragm during inspiration and the efficient contraction of the abdominal muscles during expiration which play the greatest part in forcing blood onwards from the liver and cistern into the heart. The intra-abdominal pressure may be raised considerably on bending or straining. Under such conditions the pericardium protects the right side of the heart from being over-distended with venous blood. If a tame hutch rabbit with a large patulous abdomen be suspended and immobilised in the erect posture, death may

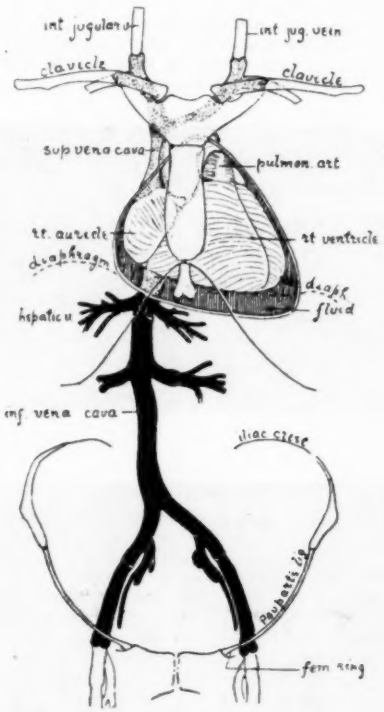

FIG. 3.—Diagram of the venous cistern from which the heart is filled (Keith). The abdominal or infra-diaphragmatic part of the cistern is indicated in black; the thoracic or supra-diaphragmatic is stippled. The heart is compressed upwards and backwards against its attachments.

result in from 15 to 30 minutes, for the circulation through the brain ceases and the heart soon becomes emptied of blood. If, however, the capacious veins of the abdomen be confined by an abdominal bandage no such result occurs.

In a man six feet high the hydrostatic pressure of a column of blood reaching from the vertex of the head to the sole of the foot is equal to 140 mm. Hg. But during the evolution of the upright posture man provides himself with an efficient abdominal belt wherewith to counteract this pressure. The splanchnic arterioles also are maintained in tonic contraction by the vaso-motor centre, and the flow of blood to the abdominal viscera thereby confined within due limits. The veins of the limbs are broken into short segments by valves, and these support the weight of the blood in the erect posture. Every contraction of the skeletal muscles compresses the veins of the body and limbs, for these are confined beneath the taut and elastic skin. Guided by the valves of the veins, the blood is by such means continually driven upwards into the venæ cavæ. In the hanging motionless arm the veins, as seen at the back of the hand, soon become congested. Forcible clenching of the fist or elevation of the limb demonstrates the great influence which muscular exercise and continual change of posture have on the return of blood to the heart. It becomes wearisome and soon impossible for a man to stand motionless. When a man is crucified, immobilised in the erect posture, the blood slowly sinks to the most dependent parts, œdema and thirst result, and finally death from cerebral anæmia ensues. In man standing erect, the heart is situated above its chief reservoir—the abdominal veins. The blood is raised by the action of the respiratory movements, which act both as a suction and as a force pump; for the blood is not only aspirated into the right ventricle by the expansion of the thoracic cavity, but is expressed from the abdomen by the descent of the diaphragm, and the contraction of the abdominal muscles. When a man faints from fear, his muscular system is relaxed and respiration inhibited. The blood, in consequence, sinks into the abdomen, the face blanches, and the heart fails to fill. He is resuscitated either by compression or by being placed in a head-down posture. Men and women with lax abdominal wall and toneless muscles take refuge in the wearing of abdominal belts. To maintain a vigorous circulation and digestion it is necessary to exercise the muscles daily, particularly those of the abdomen.

Leonard Hill studied the question experimentally by passing cannulæ down the external jugular vein and carotid artery into respectively the superior venæ cavæ and aorta of a dog, anæsthetised and placed upon a specially constructed animal table, made to turn round an axis passing through the body at the level of the cannulæ, so that upon turning the table any alteration in the level of fluid in the manometer tubing is avoided. On placing the animal in the feet-down posture, the arterial and venous pressures immediately fall (Figs. 4, 5, and 6). The venous pressure remains down until the horizontal posture is once more assumed, when the arterial pressure rapidly rises again to normal, and it may often be found to

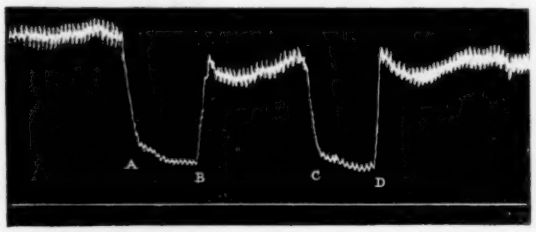

FIG. 4.—Aortic pressure (Hill). A = Vertical feet-down position B C = Effect of abdominal compression D = Horizonta position.

rise above normal. The respiratory undulations are frequently intensified while the animal is in the feet-down posture. If left long in the feet-down position the compensatory mechanism gradually fails and the arterial pressure falls. By division of the spinal cord

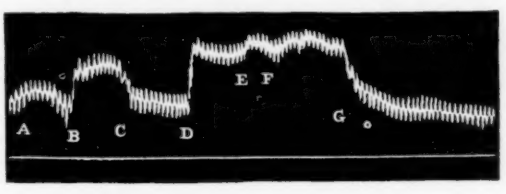

FIG. 5.—Aortic pressure (Hill). A = Horizontal position; B C = Abdomen compressed; D = Vertical feet-up position; E F = Abdomen compressed; G = Horizontal position.

at the level of the first dorsal vertebra, the influence of the bulbar centres on the parts below the section is removed. Abdominal and intercostal respiration is paralysed, and the breathing becomes purely diaphragmatic. The tone of the arterioles of the

great splanchnic area and of the musculature of the abdominal wall is lost, and the capacity of the abdominal vessels is thus greatly increased. On the animal, when lying in the horizontal posture, the total effect is a considerable fall of arterial pressure, and a marked diminution of the respiratory undulations of pressure; in the vertical feet-down posture, the arterial pressure falls rapidly, and may reach zero; the circulation is then at an end. Under the influence of gravity the whole of the blood collects in the great abdominal veins; it can pass rapidly through the dilated arterioles, there is no mechanism left for filling the heart, and the latter, empty of blood, continues to beat to no purpose. If the abdominal wall be compressed with the hand (B, C, Fig. 4), the capacity of the veins and splanchnic area is reduced, the right heart is once more filled with blood, the arterial pressure rises, and the circulation is renewed. On taking off the hand, the heart once more empties, the arterial pressure falls, and the circulation again ceases. When the animal is returned to the horizontal position, the influence of gravity is abolished, and the circulation becomes re-established. The effect of compression of the abdomen in the horizontal position is also evident (B, C, Fig. 5) but slight. In the feet-up position the aortic pressure rises under the influence of gravity, returning to normal as compensation takes place or when the horizontal position is resumed (Fig. 5). Such experiments prove that in the anæsthetised animal there are two chief compensatory mechanisms by which the hydrostatic effect of gravity is overcome—namely, the vaso-motor mechanism of the arterioles and the respiratory pump.

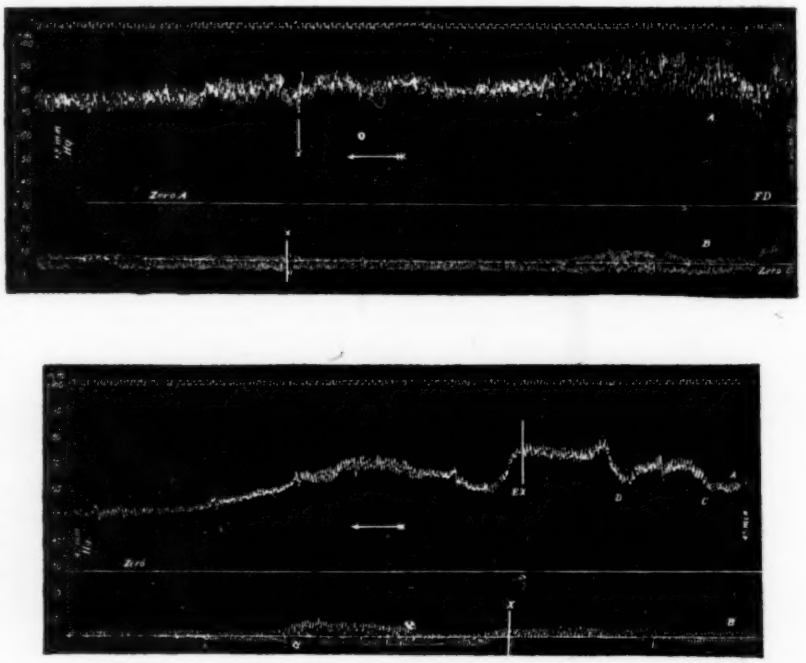

FIG. 6.—To show effect of gravity upon the circulation: carotid and superior vena cava pressures of dog (Hill). F D = Animal turned into feet-down position with cannulæ in axis of rotation. The arterial pressure fell in 50 minutes from 110 mm. Hg to 42 mm. Hg. From C to E X animal was immersed in a bath which was deepened to chin at D. Note increased effect of respiration on venous pressure after F D and again after bath. Note also fall of pressures at F D, and compensatory rise of arterial pressure, which gradually weakens.

COMPENSATORY MECHANISMS.

The vaso-motor tone of the arterioles splanchnic area can be abolished, without interference with the respiratory mechanism, by section of the splanchnic nerves through a lumbar incision. The result of this procedure in the vertical feet-down posture is that the arterial pressure falls very considerably; but, nevertheless, the circulation may remain efficient, on account of the action of the respiratory pump. By greatly increased respiratory movements, combined with powerful abdominal compressions, the diastolic filling of the heart is maintained and the velocity of flow through the splanchnic capillaries checked. Withdrawal of the support of the abdominal muscles by a crucial incision of the abdominal wall leads to dilatation of the splanchnic vessels, and the pressure falls to a further extent. Finally, opening the thorax causes the pressure to fall to zero and the circulation ceases. By compression of the abdomen, or by a return to the horizontal posture, the circulation can be once more renewed. Such an experiment shows that the respiratory pump can compensate for the influence of gravity when the vaso-motor mechanism is paralysed. The respiratory pump can be paralysed by itself, and without damage to the vaso-motor mechanism, by the injection of curari. The power of the heart may then be sufficient by itself to maintain the circulation in the feet-down position, so long as the capacity of the abdominal vessels is kept under control by the vaso-motor nerves.

In man measurements of arterial pressure likewise reveal the effect of gravity upon the circulation.[11] In a normal man standing upright the pressure in the post-tibial artery in the leg is higher than the pressure in the brachial artery by the height of the column of blood which reaches from one artery to the other, about 70 mm. Hg. (See Table I.)

In changes of posture, then, the pressure in the brachial artery—that is, in the root of the aorta—is maintained at practically a constant height by the tone of the splanchnic arterioles and action of the respiratory pump. If the splanchnic arterioles are in an efficient state of tone, and if the abdominal veins are supported by the tone of the abdominal walls, then the splanchnic vessels will not dilate under the hydrostatic stress of gravity. The nervous mechanism involved is probably of the simplest nature, for if the arterial pressure suddenly rise or fall at the moment of change in posture, the bulbar centres are thereby either directly or reflexly excited to increased or decreased activity. A sudden fall of arterial pressure provokes acceleration of the heart, amplified respiration, and increased vaso-constriction. A sudden rise of pressure, on the other hand, provokes a slow heart, shallow respiration, and vaso-dilatation.

When the compensatory mechanism is abolished by destruction, exhaustion, or inhibition of the bulbar centres the circulation fails and becomes inadequate to maintain life in the vertical posture. The blood passes into the capacious reservoirs of the toneless abdominal veins, the heart empties, and the

cerebral circulation ceases. There can be no doubt that the control of this compensatory mechanism is one of the most important and necessary functions of the group of bulbar centres—a function which must have been evolved to its highest point, as man in his evolution assumed the erect posture. During the course of each day the compensatory mechanism becomes fatigued; especially is this so after severe muscular exertion. By sleep and rest in the horizontal posture the compensatory power is restored. In conditions of neurasthenia, of weakness and exhaustion after bodily strain and disease, of shock after severe injury or hæmorrhage, this power may be greatly lessened.

TABLE I.

Posture.	Pressure in mm. Hg.		Difference in mm. Hg.	Difference calculated from height of column in mm. Hg.	Height of column separating armlets in cm.
	Brachial artery.	Posterior tibial artery.			
Horizontal ..	106	106	0	0	0
Standing	110	165	55	58	75·4
L. posture legs up	115	85	30	33	44
Vertical head down	115	50	65	63	82

A useful clinical guide to the condition of the compensatory mechanism in man is afforded not only by the pressures in the brachial artery, particularly the diastolic pressure, but by the rate of the pulse on change of posture. If the heart greatly accelerates on rising from the horizontal to the vertical position, the mechanism is deficient. From the above the importance of the respiratory movements as regards circulatory efficiency is clearly seen. The downward plunge of the diaphragmatic piston during inspiration, and the inward thrust of the abdominal wall during expiration, are necessary for man's efficiency in the upright posture.

Finally, I would draw attention to the importance of the correct muscular movements of breathing in massaging the abdominal contents. The descent of the diaphragm in inspiration, the contraction of the abdominal wall in expiration provide massage mechanism which plays an important part in the preservation of the tone of the smooth muscle of the abdominal contents.

One of the present-day evils is constipation, which does not occur when a good tone of the abdominal wall is preserved. Equally as important is the fact that the state of semi-constipation is abolished, the state in which the bowels, although acting daily, act only in insufficient fashion without the use of occasional purgatives. By what means good tone of the external abdominal muscles induces good tone of the smooth muscle is not sufficiently known, nor can it yet be adequately explained how conditions affecting directly the tone of the smooth muscle, as, for example, enteritis, bring about a relaxation of tone of the external muscles. The fact remains, however, that good tone of the muscles constituting the natural abdominal belt play an important part in preserving a healthy condition of the abdominal contents.

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SPINA BIFIDA.[1]

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BY spina bifida we mean a congenital defect of the vertebræ, usually the posterior arch, associated, in most cases, with some protrusion of the spinal contents. The defect may involve a large or small area of the spine, but when a tumour is present this is due to a protrusion of contents due to increase in the intraspinal pressure. This increased pressure may be temporary, as such cases can be cured or may undergo spontaneous cure, while others are progressive in character and are often associated or followed by hydrocephalus. Probably various combinations of these factors account for the production and different varieties of this condition. This defect occurs in about one in 1000 births and is often incompatible with life; at the best many cases succumb during their first year, and others exist for a time with various accompanying deformities.

Development of Spine and Spinal Cord.

Fully to understand the anatomy of the condition it is essential to know the method of development of the spine and spinal cord. Briefly it is as follows: in the dorsal middle line a groove appears, the neural groove, which sinks into the underlying mesoblast and subsequently, its edges fusing, it becomes the neural canal. This becomes separated from the surface, the surrounding mesoblast forming the spinal membranes. Round the spinal cord and membranes thus formed the vertebræ are developed. Cartilage being formed round the notochord and being in its turn replaced by bone, centres of ossification appear for the bodies and posterior arches. The process of ossification for the bodies commences in the mid-dorsal region and progresses up and down the spine, while the centres for the neural arches commence in the cervical region, the process extending backwards, so that the lumbar and sacral elements are the last to have a bony roof. Development may be arrested at any one of these stages and accounts for the different types of spina bifida met with clinically.

Spina Bifida as a Family Defect.

Spina bifida is met with almost equally in the two sexes, and we can only suggest that it is due to some somatic defect. Occasionally it is a family defect. One member of such a family is depicted in Fig. 1.

FIG. 1.

Meningo-myelocele in a child aged 4 months, showing large thin-walled translucent sac in the sacral region.

Here all four children had some degree of spinal defect. The eldest died at the age of 18 months with spina bifida, the type of which is unknown, and with hydrocephalus. The second child, now aged 10 years, has a spina bifida occulta, indicated by a scar and depression in the upper dorsal region and by slight scoliosis. A radiograph of this portion of

[1] A post-graduate lecture delivered at the Royal Victoria Infirmary, Newcastle-on-Tyne.

the spine shows a defect of the vertebræ. The third child is the subject of the photograph and had a large meningo-myelocele in the sacral region. This was

FIG. 2.

Same patient as Fig. 1, aged 9 years.

operated on with the result shown in Fig. 2. The patient is quite well and without deformity, the only symptom present being that she is perhaps unable to

FIG. 3.

Pedunculated meningocele in the dorsal region. Child aged 2 weeks: a hair field is seen above the tumour.

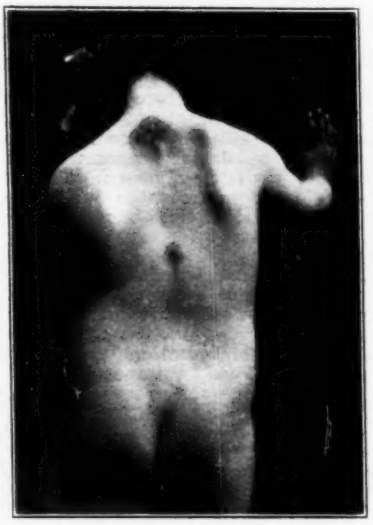
hold her urine as long as usual. The fourth and last member of the family has the least defect, which is an exaggerated post-anal dimple.

Various Forms of Spina Bifida.

As before stated, the course of the case depends mainly on the variety of spina bifida present, and whether it is associated with hypersecretion of the cerebro-spinal fluid. Those in which the central canal of the cord opens on the surface do not survive many days owing to loss of fluid or infection. The other cases may die early from ulceration or rupture of the sac with similar consequences.

Spina Bifida Occulta.—Of the varieties of spina bifida the mildest occurs where there is some defect of the vertebral arches without protrusion of the contents. This form, the spina bifida occulta, is commonest in the lumbar region. The defect is often shown by a scarring and depression of the skin in the middle line. This may be covered or surrounded by a hair field (Figs. 3, 4, and 8). In other cases the defect may be covered by a nævoid condition of the skin or a lipoma which forms a definite swelling. This spinal defect may cause no symptoms or may be associated with other deformities at birth, such as club-feet. Later in life various forms of talipes may become evident, trophic lesions may appear on the feet or legs, and an actual paralysis may result owing to

FIG. 4.



Same patient as Fig. 3, aged 8 years. A hair field partly covers the operation scar. A spina bifida occulta is seen in the lower dorsal region.

pressure or traction on the cord or nerves. In some cases a mild scoliosis or other spinal deformity may develop at the site of the defect.

Meningocele.—The next in order of severity is the meningocele, which is perhaps the least common. Here, in addition to the spinal defect, there is a protrusion of the membranes, the cavity of which is occupied by cerebro-spinal fluid. The tumour may be pedunculated (Fig. 3) and covered by normal skin, having a narrow pedicle which may become closed and a natural cure result. In other cases the sac may be large, sessile, and thin walled (Fig. 5).

Meningo-myelocele.—This, the commonest type seen in hospital, is associated with a protrusion of the membranes and some part of the spinal cord. It is, as a rule, larger than the former, having a broad base and larger defect in the spine. The coverings may be thin, scarred, and translucent; when the tumour is situated in the lumbar or sacral region the tip of the cord is attached to the summit of the tumour, the cord itself crossing the sac to reach this position. The spinal nerves also cross the sac on either side to reach the intervertebral foramina. In other region

the cord is attached by its dorsal aspect to the top of the sac, leaving the spinal canal to reach this attachment and passing down to the lower extremity of the sac to regain its normal position. In some cases the cord, at this area of attachment, may open on the surface or present a reddened and apparently ulcerated surface as is shown in Fig. 6. When the cord opens on the summit of the protrusion the condition is really a myelocele.

Syringomyelocele.—The fourth type or syringomyelocele resembles the above in many particulars, but the central canal of the cord is dilated, the distended cord occupying a portion of the sac. One such example was found at operation, and the finger could be passed readily into the dilated central canal.

Myelocele.—The myelocele is the gravest defect of the series. Here the posterior part of the spinal canal and cord is undeveloped and the central canal opens directly on to the surface at its termination or for a considerable part of its length. Indeed, the condition resembles the earliest stage of its development. The defect is seen as a red and vascular area at the bottom of which the central canal can be found. Naturally these cases do not survive long.

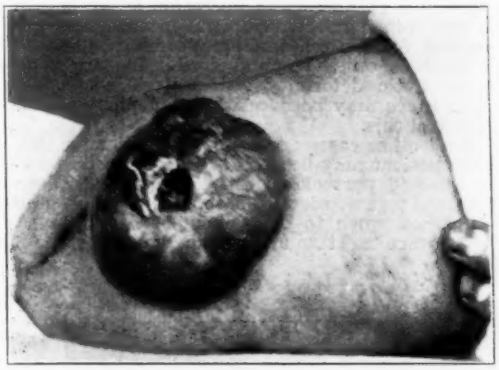
FIG. 5.

Large meningocele in the dorsal region.

Diagnosis.

The diagnosis is made on the history and appearances of the swelling. The condition is congenital, it is situated in the middle line over the spine, the surface is scarred or vascular, while in most cases a swelling is present. The covering may be natural skin, and the consistence of the swelling shows it to contain fluid. It has an impulse on coughing or straining, and if necessary fluctuation can be obtained between the tumour and the anterior fontanelle. To determine the variety present may be more difficult. Pedunculated tumours are usually simple meningoceles and are covered by normal skin. If the tumour is large, has a broad base, with scarring on the surface and transculent walls, a meningo-myelocele is probably present. In some of these three definite zones can be recognised, the apex a red vascular zone, surrounded by a thin translucent area, while at the base this merges into the skin of the back. (Fig. 6.) It is impossible to determine the syringomyelocele from external examination. The character and extent of the spinal defect can, in some cases, be determined by palpation, for the defect can be felt at the margins of the tumour. In other cases the protrusion overlaps the defect to such an extent that its edges cannot be detected. A radiograph will, however, reveal the defect if it is thought necessary to have this information. There are two conditions which may be mistaken for spina bifida. The first is a nævus in the middle line of the back, an unusual position. It can be lifted off the deeper structures and is not associated with any spinal defect. The second condition is that of sacro-coccygeal tumour. Here the tumour may be solid

FIG. 6.



Meningo-myelocele in the sacral region showing a "raw area" in the centre of the swelling.

or possess translucent cysts, but is situated at the termination of the spine, and involves the perineum and coccyx. No impulse is present on coughing or straining, and no fluctuation can be obtained with the anterior fontanelle. It should be mentioned that very rarely there may be a defect in the anterior part of the vertebræ, and that a protrusion may take place forwards into the pelvis or abdomen.

Congenital Malformations Accompanying Tumours.—In addition to a local tumour certain other congenital malformations may be present. Scoliosis may accompany the spinal defect, while it is not

FIG. 7.

Child with sub-occipital meningocele.

uncommon to find talipes equino-varus or calcaneus. Hydrocephalus may be present at birth or may supervene shortly afterwards and is the complication most to be feared. It has been mentioned that later certain nervous phenomena may appear such as paralysis due to involvement of the

motor nerves, anæsthesia, or trophic lesions such as perforating ulcer.

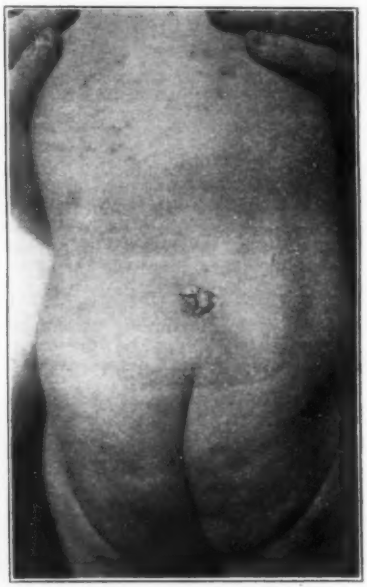
Selection of Cases for Operation.

Even of the cases submitted for one's opinion at hospital only a comparatively small number admit of surgical treatment, which should be limited to the most favourable types, and those who, after operation, are likely and capable of becoming useful members of society. It will, perhaps, be best to discuss each variety separately.

In spina bifida occulta operation is rarely required for the spinal defect. Surgical intervention may be required for the relief of symptoms due to pressure or traction on the spinal cord. In larger defects where static deformity shows itself some form of spinal brace may be necessary or a plastic operation to control this.

In all other cases certain general rules for the care of the patient may be given. It is important to keep the affected part clean, especially when situated in the sacral region, where it is too apt to become dirtied with fæces much to the detriment of its coverings. The surface or tumour should be protected from

FIG. 8.



Spina bifida occulta.

pressure and abrasion by a careful arrangement of wool round it, and its surface covered by an antiseptic dressing if thin. The lower margin of such dressing may be sealed down by strapping or collodion and so protected from the napkin area.

The most difficult question now is the selection of suitable cases for operation. Most meningoceles require operation, but as a rule there is no urgency, especially when the tumour is small and has a narrow pedicle. Operation may be carried out at leisure any time during the first year, but parents are usually anxious for the children to be put right as the tumour is a source of anxiety to them and may prevent the child being nursed on its back.

In certain cases operation is contra-indicated. The presence of hydrocephalus should be considered a bar as after operation the head continues to distend —the cerebro-spinal fluid being robbed of a second outlet for the relief of tension. Other cases presenting gross bodily deformity or deformity of limbs not easily rectified should be included in this group. Certain technical difficulties may present themselves in dealing with some of these cases. Owing to the large size of the tumour, and especially if a considerable part is composed of thin translucent membrane, much difficulty may be experienced in covering over the raw surface after removal. In other cases, where a raw spinal area or ulceration is present, sterilisation of this surface may prove difficult, and if not effected leads to wound sepsis and often death.

Cases in which operation is of doubtful use are those of myeloceles and meningo-myeloceles where there is a large raw area. Even if operation is successfully accomplished, deformity is likely to become manifest as the patient grows older, and one such case has complete incontinence of urine and fæces and is a nuisance to himself and his parents. No operation should be undertaken if hydrocephalus is present, but if doubt is felt about this point the head may be measured at regular intervals and its rate of growth noted.

Method of Operation.

In performing the operation the child should be supported on a pillow and lie on its face with the head at a lower level than the trunk, to prevent the undue escape of cerebro-spinal fluid. The first step in the operation consists in exposing the neck of the sac by an encircling incision—designed to leave as much skin as possible for covering over the defect. The neck of the sac should now be isolated—this consists of the dura mater and needs to be cleared of fascia and other coverings obtained from the spinal muscles. In meningoceles, when the neck is narrow, it may be ligatured and the stump returned to the spinal canal; or it may be opened, the redundant sac being then removed and the opening in the neck closed by suture.

In meningo-myeloceles, after the neck is isolated, the sac is opened at one side and the contents inspected. The spinal cord is then separated from its attachment to the apex of the sac and returned with its nerves to the spinal canal. The redundant portion of the membranes is then removed, and the dura and arachnoid closed. In some cases it is impossible to pack the cord back into the spinal canal. In these cases it must be left projecting as far as necessary in the hope that with growth in length of the spine it will gradually be drawn into its proper place.

The third stage in the operation consists in repairing as far as possible the spinal defect. Where a small opening only is present it may, by small incisions undercutting the margins, be possible to draw these together and give sufficient protection to the cord and prevent further displacement of the contents of the canal. In cases where a larger defect is present incisions are made along the outer margins of the erector spinæ muscles through the lumbar fascia. This is dissected up on either side towards the middle line, and the flaps so formed turned over the gap and sutured together. In order to further supplement this covering similar portions of the erector spinæ itself may be used in like fashion. Following this the skin is brought together—a procedure which may require considerable undercutting or even flap formation.

In some cases an osteoplastic repair may be necessary. It has not been so in my cases, but in order to form a bony covering for the defect the spinous processes above and below the gap may be cut across at their bases and turned to meet one another and sutured over the defect. A further possible method is to expose and divide the laminæ of the affected vertebræ on each side and bring them together in the middle line. Where a considerable defect requires filling, and especially if some deformity has arisen or is likely to arise, bone grafting, after the method of Albee, would be suitable.

STUDIES FROM THE ST. ANDREWS INSTITUTE OF CLINICAL RESEARCH.

II. CASE-TAKING METHODS.

BY J. H. P. PATON, M.B., CH.B. EDIN.

Introduction.

IN 1918 Sir James Mackenzie was appointed consulting physician to the St. Andrews Cottage Hospital. In that capacity he at once instituted weekly out-patient clinics, at which he saw patients brought to him by medical practitioners in the town. These clinics took the form of meetings which attracted not only local practitioners but a number of doctors from the surrounding district; discussions took place on the special problems which confront the general practitioner, and on the need for systematic investigation of these problems. It became obvious that a vast amount of material for their solution was lost, or could not be utilised, under the present conditions of general practice. As a direct result of these discussions Sir James Mackenzie enlisted the support of all the local practitioners, and plans were drawn up for the creation of an Institute for Clinical Research. The idea of founding such an institution had long been present in Sir James Mackenzie's mind, and he had made an attempt in that direction at the London Hospital, but it was found to be impossible to keep in touch with patients where the population was of so migratory a character, and he realised that the plan was only possible in a small town such as St. Andrews with a comparatively stationary population.

As a result of his influence several personal friends of his own, who realised the possibilities of the scheme, offered to provide the necessary financial support for its initiation. A council was formed, and a building was acquired on lease and suitably fitted up, containing consulting rooms and examination rooms and laboratories for radiology, chemistry, and bacteriology. The Carnegie Trustees made a grant for five years to provide the services of a fully-qualified chemist and also those of a bacteriologist. The general basis of the work of the Institute was set forth in the minute of the first general meeting of staff, held on Sept. 5th, 1919, as follows:—

> "The main objects of research would be the early stages of disease, and the work would primarily consist of detailed observation of symptoms and the keeping of careful records. Prolonged observation of cases would be carried out in order to discover the significance of early symptoms, and researches would be undertaken with a view of ascertaining the mechanism of their production."

This minute makes clear the two essential needs which justified the establishment of the Institute—namely, (1) The need of obtaining accurate records of the earliest symptoms of disease, at a stage prior to the occurrence of structural damage; (2) the need of following up each individual case from its onset to its termination.

Upon these essentials depends any advance in the early diagnosis of disease and in its accurate prognosis. It is true that the hospital records throughout the country are full of information regarding the symptoms of disease, but a little consideration will show that they cannot be records of those facts with which the staff of the Institute are attempting to deal. Advanced cases and cases of acute illness alone are admitted to hospital wards. The symptoms recorded are those of fully established disease; the physician does not see in the hospital ward those early stages of disease which it is our purpose to investigate. As soon as his patient has sufficiently recovered to resume work he returns to the care of his general practitioner, and all record of his case ceases. Hospital records do not provide first-hand information of the patient's earlier symptoms, habits, and environment in the stages when the necessary information may be acquired.

In the rush of a busy practice the making of accurate records is extremely difficult, and leisure for classification and analysis cannot easily be obtained. The St. Andrews Institute affords facilities to the general practitioner for making such records, and supplies means whereby when taken they are made permanent and systematically kept, so that information can be drawn from them and incorporated into the general sum of medical knowledge.

The first staff meetings were devoted to the consideration of a general scheme of case-taking applicable to early cases of disease. The following scheme was ultimately adopted, and a year's experience has convinced the staff of its suitability for the purpose.

I.—*General Scheme of Case-Taking.*

Duties of the Doctor.—(1) Elicit clearly the sensation which led the patient to the belief that he was ill; (2) elicit other sensations associated; (3) have a clear idea in mind as to the information to be elicited by questions; (4) never leave a particular symptom until fully investigated; (5) use questions suitable to the patient's understanding.

The Patient.—(1) Details of main complaint; (2) associated sensations; (3) origin and history of present complaint; (4) general survey of each system or organ by questions, to elicit other associated sensations; (5) previous health; (6) family surroundings, home surroundings, habits, &c.; (7) physical examination: (*a*) general appearance (physiology, peculiarities of manner, &c.); (*b*) physical signs (under systems); (*c*) urine, &c.; (8) opinion; (9) treatment; (10) after-history.

Duties of Doctor.

It will be observed that the scheme is prefaced by certain directions of such simplicity that they are especially liable to be forgotten, but essential for detailed accuracy in recording the phenomena present before gross physical changes are perceptible. They differentiate clearly the leading symptom from associated symptoms, and discourage aimless and haphazard investigation. In the fourth the complete investigation of every symptom is insisted upon. It was soon recognised by everyone that the doctor's conception of symptoms were in general so hazy that steps must be taken to obtain a clearer insight. Consequently, although the earlier notes were unsatisfactory, continued investigation into the nature of symptoms is rendering these notes daily of more value.

The Patient.

It was early realised that for successful inquiry into the patient's sensations the element of possible suggestion by the examiner must be eliminated. Simple inquiries make clear to the patient that his own sensations of ill-health are what we desire. It is the examiner's duty tactfully but firmly to suppress the numerous suggestions emanating from relatives and friends that appear in the patient's story at this stage. Many pertinent symptoms may have been omitted by the patient as being of no importance; these should be elicited by careful inquiry. In order that the examiner may carry this out in an orderly and logical manner, it is essential that he should have previously obtained some general idea of the origin and history of the complaint. This, then, is taken before proceeding to the systematic inquiry into symptoms present (No. 4). The remainder of the scheme proceeds upon conventional lines, but special care is taken to note all details in regard to family history, environment, diet, occupation, &c., factors which there is every reason to believe are frequently germane to the development and perpetuation of ill-health.

Perhaps the most essential part of the scheme is that dealing with after-history. Arrangements are made to ensure that each patient will be again seen from time to time, and the records of his condition and any subsequent illnesses are added to the case. In this way in the course of years the elements of a scientific system of prognosis will be built up—prognosis, that is to say, based upon the outcome of actual cases, and not upon the vague fears engendered by abnormal phenomena of whose significance we are ignorant.

II.—*The Special Symptom Sheets.*

Early in our work it became evident that certain well marked symptoms are common to many states of ill-health—for example, pain, exhaustion, &c. It was decided to attempt to differentiate the nature of each of these symptoms: (1) By careful consideration of the associated phenomena present in each case; and (2) by a systematic investigation of their mechanism.

The first step was to decide which phenomena associated with each leading symptom should be systematically recorded. As a result of many discussions sheets were drawn up embodying points considered essential for uniformity and accuracy. These sheets are still provisional and are regularly reviewed from time to time; only by a lengthy experience can they be brought to anything like perfection. All sheets filled up for any one symptom, common to a number of diseased states, are filed together, and compared and analysed. In this way types of exhaustion, breathlessness, headache, &c., characteristic of certain morbid states can be differentiated by consideration of the variety of the associated phenomena present in each case. The details of some of these sheets are recorded below with some comments on their objects and uses. The following is the sheet for recording pain.

PAIN.

A.—*Subjective Phenomena.*

(*a*) Regions; (*b*) area and point of maximum intensity; (*c*) radiation; (*d*) character—dull, aching, sharp, lancinating, wave-like, &c.; (*e*) how induced, relieved, and aggravated; (*f*) relation to effort, posture, &c.; (*g*) time of onset and duration.

B.—*Associated Phenomena.*

1. *Subjective.*—(*a*) Faintness; (*b*) giddiness; (*c*) others—e.g., visceral reflexes such as vomiting, frequency of micturition, &c.

2. *Objective* (Physical Examination).—(*a*) Hyperalgesia of skin, subcutaneous tissue, muscle; (*b*) deep tenderness; (*c*) rigidity of muscles; (*d*) cutaneous reflexes: muscular, pilomotor, vasomotor.

Pain as a symptom calls so urgently for immediate relief that its careful investigation is frequently omitted and its diagnostic value lost. That it is induced by stimulation of definite afferent paths is undoubted; were these paths accurately known the seat of origin of their stimulus could be inferred. Direct experiments on animals give little information of the sensations evoked, and elucidation can only be effected by inference from the study of sensory phenomena in man. Pain is, nevertheless, the most useful and often the only symptom determining the locality of an abnormal stimulus. The frequency of reflex or referred pain has been demonstrated, and it is possible in many cases, as a result of accumulation of clinical experiences, to infer the locality of the stimulus. This inference is largely guided by the consideration of the associated phenomena present. The pain sheet has been devised with the object of bringing out the associated phenomena. The character of a painful sensation is of more importance than is commonly believed, the remittent character of pain due to disordered peristalsis of the hollow viscera, and the various qualities ascribed to it by patients, are all of importance, but apart from this the use of the word pain by a patient is frequently misleading. The term is used for any disagreeable sensation, and it should be the aim of the examiner to determine the exact character of the sensation complained of. What is described as pain after food is often in reality a sensation of fullness and distension. The associated phenomena to be specially recorded in this sheet are selected with the idea of differentiating the mechanism disturbed; the pain experienced in heart affections, for example, never seems to be associated with vomiting, while it is common knowledge that vomiting is frequently associated with the intense colics which occur in disease of some of the abdominal organs (gallstones, renal calculus, uterine contraction, &c.).

The following is the sheet for recording exhaustion.

EXHAUSTION.

Sensation of Exhaustion.—(1) Time of day felt; (2) variations in intensity; (3) relation to effort; (4) relation to food; (5) relation to posture; (6) relation to rest.

Associated Subjective Phenomena.—(1) Breathlessness; (2) palpitation; (3) giddiness; (4) sweating; (5) nausea; (6) faintness; (7) sinking in epigastrium; (8) chilliness; (9) headache; (10) mental phenomena, depression, loss of memory, irritability, lack of concentration, &c.

Associated Objective Phenomena.—Blood pressure, pallor, flushing, ocular phenomena, tache cerebrale, effect of abdominal compression on filling of jugular vein, reflexes, blood count.

Type of Exhaustion Present.—Exhaustion is one of the commonest sensations of which patients complain, and is frequently the first indication which comes to them of failure of health. Numerous early discussions, devoted to this subject, demonstrated how little is known about this important symptom; but as time went on it became clear, mainly through the researches of Dr. J. Orr, that it may be possible to differentiate certain types of exhaustion and to correlate some of them with certain types of disease. Great difficulty is experienced in locating the tissues to which the sensation of exhaustion is referred. In some cases the feeling of disability is mainly experienced with regard to muscular activity, but in the majority the sensation is more generalised and referable to all parts of the body.

Fatigue is believed to be caused by the action of chemical products upon the neuro-muscular apparatus. In our series of cases of exhaustion there is almost invariable evidence of the presence of toxæmia. It therefore seems possible that exhaustion is due to a process similar to the action of fatigue toxic substances upon nerve cells, nerve endings, or synapses. The present sheet on exhaustion is designed to bring out the associated phenomena present which appear likely to throw light upon the mechanism of its production.

The following is the sheet for recording response to effort.

RESPONSE TO EFFORT.

Nature of limiting sensation (see below).

Is tolerance acquired by repeated effort? (Details of this.)

Describe response to (*a*) gentle continued exercise; (*b*) short sharp exertion.

Symptoms associated with limiting sensation: Pain, breathlessness, exhaustion, syncope, palpitation, giddiness, &c. (See special sheets.)

If limiting sensation occurs apart from effort (*a*) is it delayed? (*b*) is it totally unrelated to effort?

Amount of effort producing limiting sensation, with sensation produced: (*a*) On level at usual pace; (*b*) on hill or stair; (*c*) on level with accelerated pace; (*d*) before food; (*e*) after food; (*f*) on warm day; (*g*) on cold day.

Limitation of capacity for work apart from distress.

Present disability increasing, stationary, diminishing, or variable.

Patient's capacity for effort when in good health.

Directions for Study of Response to Effort.

Nature of limiting sensation: Pain, breathlessness, exhaustion, any other.

A. If effort limited by pain: (1) Fill up pain sheet with particular reference to site, radiation, &c.; (2) whether tolerance acquired by repeated effort; (3) if so, note minimum and maximum amount of effort; (4) whether associated with breathlessness or exhaustion; (5) any other associated symptoms.

B. If effort limited by breathlessness: (1) Note if associated with pain or exhaustion; (2) if so, note effect of (*a*) gentle continued exercise, and (*b*) short sharp exertion, on nature of limiting sensation; (3) whether breathlessness occurs, independently of exertion; (4) any other associated symptoms.

C. If effort limited by exhaustion: (1) Fill up exhaustion sheet; (2) note if associated with breathlessness or pain; (3) if so, inquire as to B. (2) above; (4) if exhaustion followed by rise of temperature; (5) any associated symptoms.

D. If effort limited by any other sensation, fill up appropriate sheet.

In all cases.

(1) Note amount of effort necessary to produce distress: (*a*) On level going at own pace; (*b*) on hill or stair; (*c*) on

level if pace accelerated, and note nature of distress produced.

(2) Compare amount of effort possible without distress: (*a*) Before and after food; (*b*) on warm and on cold day, and note nature of distress produced.

(3) If no distress complained of on effort, note if there is any diminution in capacity for work.

(4) Endeavour to estimate, for comparison, the patient's capacity for effort while in good health.

(5) Note whether present capacity is increasing, stationary, or diminishing.

The Response to Effort.

In addition to other symptoms of disease, failure of health is frequently indicated by a limitation, in one direction or another, of the capacity for effort. Breathlessness and pain are the two symptoms which appear in patients as the first evidence of cardiac inefficiency. Exhaustion, palpitation, and giddiness, on the other hand, indicate, as a rule, some extracardiac cause; where they occur alone—apart from breathlessness or præcordial pain—the efficiency of the myocardium is not at fault. The organ whose efficiency is impaired can be ascertained in any case only by consideration of the associated phenomena present. The object of the "Response to effort sheet" is to ensure the recording of such associated phenomena as we at present consider of use in this direction.

The impossibility of fixing a standard of effort common to all patients was early realised, and the individual standard was adopted—i.e., the amount of effort that could be undertaken by the individual while in health.

This consideration is well illustrated by the case of a blacksmith who complained of breathlessness on climbing a hill or a stair, while he felt no distress on swinging his hammer in his daily work.

It is, moreover, true that the capacity of each organ to respond to effort must be the ultimate test of its efficiency. The inefficient kidney, for example, in its advanced stages produces symptoms forming a definite clinical picture. One must suppose that these symptoms represent the terminal phase of a gradual development; and that the accurate observation of such cases in their early stages would elicit a definite symptomatology characteristic of the onset of inefficiency. No doubt each organ reacts first to some particular need of the organism, and it lies with the clinician to determine that need and the symptoms which indicate the failure of the organ to meet it.

As all organs have periods of quiescence and periods of activity it is manifest that the first sign of failure will be a limitation of the field of response to effort. Only by prolonged experience can we acquire a knowledge of the details essential for a proper inquiry into the significance of limitation of effort in the case of each organ. This sheet, therefore, even to a greater extent than the others, is provisional, and the directions by which it is accompanied serve to emphasise this.

Methods Employed by the Institute for Securing and Investigating Material.

Each practitioner on the staff has, in the Institute, a private room which is reserved for two hours in the day for the examination of research cases. During the rest of the day he is at liberty to use it as his private consulting-room. He selects cases suitable for research from his private practice and investigates them during his research hours. Each member of staff is at liberty to consult any of his colleagues at any stage in the case; in order that the utmost benefit may be derived from this privilege, each member of the staff makes himself specially familiar with the literature of one particular branch of clinical medicine—cardiology, neurology, and so on. The necessary chemical, bacteriological, hæmatological, and radiological investigations are carried out by the special departments, and with each specimen or case full clinical notes are supplied to the special department. When the notes of each case are completed they are read at a full meeting of staff and discussed in detail. Indices are kept of all symptoms recorded, and of the leading symptom and provisional diagnosis of each case, and arrangements are made to ensure the return of the patient at regular intervals. Two full copies of each case are made and filed, one for the use of any member who is interested in any particular case, and the other for permanent preservation in a fireproof safe.

Finally each case is considered in detail by a special committee, whose duty it is to classify and tabulate the findings, and to see that all cases are utilised for special investigations. If this committee finds that a case taken by one member of staff has some bearing on special work in charge of another it is its duty to inform the latter of the fact. This committee also keeps a note of the date upon which each patient should return; and at the beginning of each month a list is sent to each clinician of the patients whom he should arrange to see during that month. In addition to the regular research work and the weekly reading of cases, one afternoon in each week is devoted to the discussion of some subject of interest which is chosen by the clinical staff and is introduced by the member who happens to be specially interested in it.

A NEW METHOD OF INVESTIGATING GASTRO-INTESTINAL SECRETION.

BY E. C. DODDS, M.R.C.S., L.R.C.P. LOND.,
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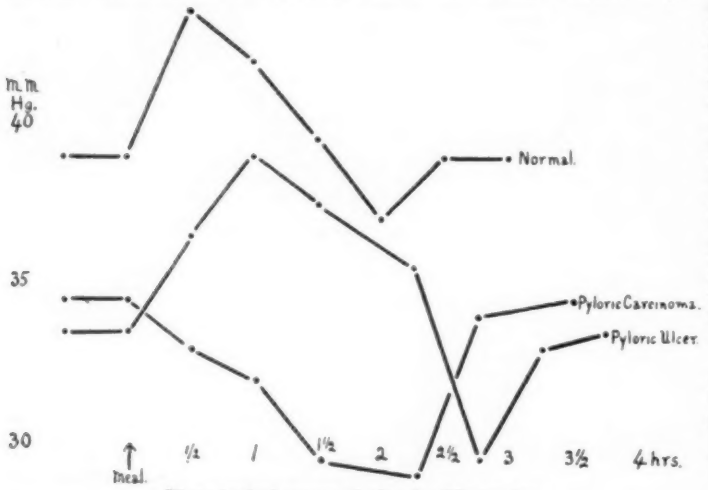
THE purpose of the present communication is to draw attention to a new method of investigating the secretory activity of the alimentary tract in health and disease. By taking samples of the alveolar air at intervals after a meal, the writer[1] was able to demonstrate that the tension of carbon dioxide undergoes certain definite changes in response to the amount of secretion poured out (*a*) by the stomach, (*b*) by lower portions of the alimentary tract. In later work, in conjunction with Dr. T. Izod Bennett,[2] it was shown that in normal individuals of varying type the curve of alveolar CO_2 tension so obtained corresponded closely with the curve of secretion of gastric HCl. The variations in CO_2 tension may be explained in the following way: when acid is removed from the blood during gastric secretion the reaction of the blood tends to shift to the alkaline side. This shifting is prevented by retention of the volatile acid, CO_2, the tension of which rises in the blood, and hence in the alveolar air. Later, when the alkaline intestinal and pancreatic secretions are poured out, the reaction of the blood tends to shift to the acid side, and hence acid in the form of CO_2 must be eliminated. This is brought about by a lowering of the CO_2 tension in the blood, and therefore in the alveolar air.

This method has now been applied to a number of pathological cases, examples of which are given. The figure shows three curves obtained (*a*) from a normal individual, (*b*) from a case of pyloric carcinoma, and (*c*) from a patient with pyloric ulcer, respectively. In the curve marked normal it will be seen that, after a meal, the tension rose 4·5 mm., returning to its previous value in 1½ hours, then fell 2 mm., and finally returned to its original level in 2½ hours. After this it remained constant. The pyloric ulcer curve shows a greater and more prolonged rise (5·5 mm. lasting 2¼ hours); on the other hand, the curve obtained from the case of pyloric carcinoma shows no rise, but a steady fall of 5·5 mm.

Method of Collecting Alveolar Air.

For a description of the physiological processes of which these changes are the expression the reader is referred to the article by the writer and Dr. Bennett,[2] the present communication is not intended to be more than preliminary. The samples of alveolar air were collected by the Haldane-Priestley method, and the analysis was made with Haldane's gas analysis apparatus, less delicate methods, such as that of Fredericia, proving useless. The technique is as

follows. Before the patient's breakfast two samples of alveolar air are collected. The patient expires as forcibly as possible into a long rubber tube; after full expiration he closes the end of the tube with his tongue, and a sample of the last air expired is drawn off from the tube into an evacuated receiver attached to the tube as near the patient's mouth as possible. Two samples are collected in this manner, one taken at the end of an inspiration, one at the end of an expiration. The percentage of CO_2 is then determined by analysis with Haldane's apparatus, the mean of the inspiratory and expiratory samples being taken to represent the tension. The patient then has a standard breakfast, composed of a glass of milk and three rusks. After the meal samples are collected and analysed quarter-hourly until the tension remains constant for two readings.



Three typical curves of alveolar CO_2 tension.

Conditions giving Characteristic Curves.

We find that the following conditions when investigated by this method give curves which are at least as characteristic as those obtained by the fractional test-meal: (1) hyperchlorhydria, (2) hypo- and achlorhydria, (3) rapid emptying of stomach, (4) carcinoma of stomach, (5) pyloric ulcer. When a result is obtained indicating the presence of any one of the first three of these it is important to remember that very wide variations in gastric secretion, ranging from extreme hyperchlorhydria even to achlorhydria, occur in quite healthy persons.[2 3]

Advantages of the Method.

The above curves provide examples of the very definite pictures yielded by this method in various pathological conditions. The following advantages distinguish it from other methods in use:—

1. The analysis of alveolar air does not cause the subject any discomfort whatever, hence it can be employed even in patients in whom nervousness, or some other general condition, forbids the passage of stomach tubes of any type. The insertion and retention of the stomach tube in the fractional test-meal produces in some few persons considerable discomfort, with nausea, retching, and salivation. It is difficult to believe that gastric digestion follows its usual course under these conditions; hence in such persons the test-meal must give misleading results. In the method described in this paper, on the other hand, the patient, if not informed, would not even know that his digestive system was under examination.

2. The method gives an index of the *total* amount of acid or alkali being secreted from the blood by the gastric or other digestive glands, and hence is independent of neutralising factors such as mucus and regurgitation which affect ordinary gastric analyses.

3. It gives a measure of secretory activity below the pylorus as well as that of the stomach.

4. The form of test-meal is immaterial provided that a fixed standard be selected, allowing comparisons with the curve shown by normal persons after the same meal.

A paper is in preparation in conjunction with Dr. Bennett dealing with a large number of pathological cases in which the results obtained by this method will be shown to be parallel with those obtained by the fractional method of gastric analysis.

References.—1. Variations in Alveolar CO_2 Pressure in relation to Meals, E. C. Dodds, Jour. Physiol., 1921; liv., 342. 2. The Gastric and Respiratory Response to Meals, T. Izod Bennett and E. C. Dodds, Brit. Jour. Exp. Path., 1921, ii., 58. 3. A Study of Gastric Secretion, T. Izod Bennett and J. A. Ryle, Guy's Hosp. Rep., 1921, lxxi., 286.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF MALIGNANT PUSTULE WITH MULTIPLE LESIONS.

BY R. T. GRANT, M.B., CH.B. GLASG.,

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THE following case is somewhat similar to one reported by Dr. W. T. G. Davidson in THE LANCET of Jan. 19th, 1918 (p. 104), and is of interest in that it repeats several of the unusual features described by him.

K. E., a butcher, skinned on Jan. 22nd a bullock, which the following day was found to have died of anthrax. On hearing of this K. E. had his shirt and underclothes disinfected and washed his arms in disinfectant. He did not, however, have his outer clothes disinfected. On the 30th a small pimple appeared on the back of his right hand between the thumb and first finger. It was very itchy and irritable and there was a thin clear discharge from it. Condition was not diagnosed as anthrax until Feb. 2nd when the patient was admitted to this hospital.

On admission he was found to have a typical malignant pustule on the dorsum of the right hand between the first and second metacarpals, measuring half an inch in diameter and showing central eschar, ring of vesicles, and surrounded by a zone of inflammatory œdema. There was brawny œdema of the radial side of the hand, but this did not extend above the wrist, nor was there any lymphangitis or enlargement of lymphatic glands of the arm. A second, but much smaller pustule (which had not been noticed by the patient) was found on the radial side of the left forearm at the junction of the upper and middle thirds surrounded by a zone of œdema about five inches in diameter. Two small pimples were noticed lying to the outer and upper side of the latter, but these did not present the typical appearances of malignant pustule and were not surrounded by œdema. No lymphangitis or lymphadenitis of left arm. Patient's general condition was apparently unaffected and there was no pyrexia. Smears from the first and second pustules showed Gram-positive anthracoid organisms and staphylococci, the third and fourth pimples showed staphylococci only. The two pustules were excised on Feb. 2nd, and the patient was given 40 c.cm. of Sclavo's serum subcutaneously into the abdomen. On the following morning as there was some spread of the œdema on the left arm a further dose of 20 c.cm. of serum was administered. Patient made an uninterrupted recovery.

The anthracoid organisms were isolated and found to be true virulent *B. anthracis*. The animal inoculation was carried out by Dr. J. A. G. Burton of the Royal Infirmary, Glasgow, who reported the organism to be very virulent, a small dose killing a guinea-pig in 36 hours.

The unusual features of this case are (1) the long period intervening between the exposure to infection and the development of the first pustule, and (2) the presence of a second and younger lesion. The incubation period usually given for malignant pustule is from one to three days, but in this case eight days elapsed before the pustule appeared. However, it is possible that, although the patient changed his shirt and underclothes, spores had already been transferred from these to his jacket and infection of the skin may have taken place subsequently. Clinically the second pustule was much younger than the primary one, and its development is probably to be explained by auto-inoculation, as the patient admitted scratching the first one when it appeared. Also to be noted is the absence of general symptoms and the slight local reaction, although the primary lesion had been present for four days before admission, and the organism was proved to be very virulent to the guinea-pig.

TWO UNUSUAL CASES OF ABDOMINAL TUMOUR.

BY E. C. BEVERS, M.B., B.CH. OXON.,
F.R.C.S. ENG. & EDIN.,
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BOTH these cases are of sufficient rarity in the surgery of the abdomen to warrant their being placed on record.

CASE 1. *Large Splenic Cyst.*—This patient, who had never suffered from any illness, was the mother of a boy aged 6 and twins aged 4. After the birth of the twins and when she got up she noticed that her figure was not quite as it used to be, it was a little fuller on the left side than the right. The swelling on her left side gradually got larger during the next four years, but she suffered no pain or discomfort. She was admitted to the Radcliffe Infirmary in February, 1918, and examined by the late Sir William Osler, and the notes which he dictated while examining the patient I give in his actual words.

"A healthy woman, aged 44, not anæmic, pulse regular, arteries good. On examining the abdomen there is a large irregular prominence in the epigastric, left hypochondriac, and left lumbar regions, which lifts the costal margin and bulges the left flank; there is also a marked prominence just above and to the left of the umbilicus. The tumour crosses the mid-line and extends nearly to the right mammary line, and descends with inspiration. No intrinsic movements could be seen, there is slight diffuse pulsation, and coils of intestine are visible at the navel. On palpation the mass occupies upper left quadrant of the abdomen, it is irregular and extends to level of left anterior superior iliac spine, and passes under left costal margin; the finger can be placed between it and the costal margin. It is soft and elastic in front, there is no edge to be felt, it is harder on the right side. Where it is more irregular it descends freely with inspiration and the fingers cannot be placed above it. Behind, with fingers in the renal region, it can be pushed forwards and grasped between the hands and pushed down. The colon cannot be felt over it, the upper limit of dullness is in the mid-axillary line on the seventh rib. It feels soft, elastic, and mobile, and is probably a soft elastic cyst hydronephrotic in origin; the renal region is definitely occupied by the mass. The right kidney is quite palpable and is not enlarged."

Examination of Urine.—Acid, specific gravity 1020, urea 2 per cent., no abnormal constituent. *Cystoscopy.*—Both ureters secreting; ureters catheterised and normal urine collected from each.

Operation.—March 5th, 1918. A long para-rectal incision was made on the left side; the tumour proved to be a cyst of the spleen about the size of an association football. The spleen, much elongated, lay on the outer or left side of the cyst, and the splenic pedicle was stretched out over the convex cyst wall. There were numerous adhesions of the cyst to the left vault of the diaphragm, these were clamped, divided, and ligatured, some of them with a little difficulty; the splenic pedicle was divided and ligatured and the spleen removed.

There was no difficulty with the operation, except in the ligature of some of the strong vascular adhesions to the diaphragm. The patient made a good recovery, was discharged from hospital on March 31st, 1918, and is in good health at the present date.

The pathological report by Dr. A. G. Gibson was as follows: "Specimen consists of a spleen with large cyst wall attached; there is moderate fibrosis of the splenic tissue; the cyst itself is full of blood-clot undergoing degeneration. This is probably an infarction cyst."

This case is an example of the real difficulty that often faces one in making a diagnosis of an abdominal tumour. The tumour was without doubt a cyst, and the diagnosis of hydronephrosis was justifiable until after cystoscopy and catheterisation of the ureters; even then a cystic tumour of renal origin could not be excluded. A splenic cyst was considered, but one was unable to feel anywhere the crenated border of the spleen. Moynihan[1] divides splenic cysts into (*a*) serous cysts, blood cysts, lymph cysts; (*b*) hydatids; (*c*) dermoids. This was a blood cyst, and it is suggested that it may have been due to an infarct, which appears to have originated at the end of the last pregnancy, as it was directly after the latter that the swelling was noticed.

CASE 2. *Large Extra-peritoneal Fibro-myoma.*—D. S., a married woman, aged 49, had noticed that her abdomen had been increasing in size for the last nine years, in fact, ever since she gave birth to her last child. She consulted her medical man because of large veins in her legs, chiefly the left, and at that time it was thought that she was pregnant; for the past two years she had suffered from frequency of micturition and difficulty of control. On July 10th, 1919, she was seen by me at the Radcliffe Infirmary, Oxford. On examination there was a large firm abdominal tumour springing apparently from the pelvis and reaching up to the umbilicus. The surface of the tumour was firm, hard, and non-elastic, and there was slight lateral movement. On vaginal examination the uterus could be felt pushed back behind the tumour; it appeared to be of normal size and to be separate from the tumour.

Operation.—A mid-line incision was made between the pubes and the umbilicus, and in doing so the tumour was slightly cut into; the peritoneal cavity could not be opened until the incision had been carried well above the umbilicus. The tumour was found to be extra-peritoneal and to be filling up the abdominal cavity by pushing the peritoneum in front of it; the peritoneum had been raised in front as high as the umbilicus. The uterus and all its appendages were identified; they were normal and had been pushed down into the pouch of Douglas by the tumour.

The latter was hard, encapsuled, and firmly attached to the apex of the bladder, some of the muscular fibres of the bladder being divided during the process of separation; there was a second point of attachment at the umbilicus. Elsewhere the tumour shelled out readily, but some of the invaginated peritoneum had to be removed with it. The gap in the peritoneum was closed and the abdominal wall sutured. The patient's recovery was uneventful. The tumour measured 10 in. in its long axis; the pathological report described it as a fibro-myoma undergoing colloid degeneration. It may have originated from the apex of the bladder or the urachus; seeing that the tumour was firmly attached to the apex of the bladder and the umbilicus, the two attachments of the urachus, it is reasonable to assume that it originated in the latter structure.

Thomson Walker[2] states that fibromyomata of the bladder may be intra-vesical, interstitial, and extra-peritoneal, and that about 20 cases have been collected. This case may then be regarded either as an extra-peritoneal fibromyoma of the bladder, or a fibromyoma of the urachus.

A CASE OF PARALYSIS OF THE SOFT PALATE FOLLOWING NON-DIPHTHERITIC TONSILLITIS.

BY J. PEREIRA GRAY, M.D. BRUX., M.R.C.S. ENG.

THE following case is of sufficient interest to merit permanent record.

L. W., aged 19, consulted me on July 1st for a sore throat. On examining the fauces, the left tonsil was found

[1] Sir B. Moynihan: Abdominal Operations.
[2] J. W. Thomson Walker: Genito-Urinary Surgery.

swollen and covered with a circular patch about the size of a shilling. No gland was palpable, but there was some tenderness at the angle of the left jaw. A swab, taken and sent to the city analyst, was reported negative. Four days later, as the membrane appeared very resistant to local treatment, a second swab was taken, which was also reported negative. The membrane disappeared on the twelfth day, having apparently yielded to frequent applications of glycerine of tannin. On the 21st day the patient's friends noticed that the voice had become distinctly nasal, and two days later she noticed for the first time that liquids returned through the nose. Nasal and pharyngeal swabs were now taken, and these were once again pronounced to be negative. On three separate occasions the urine was examined and no albumin found.

There was an epidemic of diphtheria in the town at the time, but the failure to isolate the bacillus on three separate occasions, the strict localisation of the membrane to the tonsil, the absence of albuminuria and glandular enlargement, would justify one in pronouncing the case as non-diphtheritic tonsillitis.

Exeter.

A CASE OF SCURVY.

BY R. S. MCCLELLAND, M.D. EDIN.

SCURVY is sometimes seen among children in the British Isles to-day, but among adults it is very uncommon. The following case is therefore of interest.

B. C., a collier, aged 40, came to my surgery on July 29th of this year and complained that his teeth were bleeding. He looked ruddy and sunburnt, as most of our colliers are now. His breath was offensive, many of the teeth were carious, and blood was oozing out from the swollen and spongy gums. As fast as it was wiped away from the necks of the teeth it reappeared. Thousands of petechial ecchymoses were to be seen on the limbs and trunk. There were faint systolic murmurs in all the cardiac areas with a pulse-rate of 100, and a normal temperature. There was no albumin in the urine. The patient was seen on August 2nd, 4th, and 6th; the bleeding from the gums continued, while he also complained of weakness and headache. On the evening of the 6th he became unconscious. Deep coma, with stertorous breathing followed, and he died early on the 7th. Late on the 6th it was noted that the pupils were equal, but the right arm was very flaccid. Patient called vegetables "pig's food," and appears to have lived principally on bacon, bread, and tea.

It is not likely that members of the present Polar expedition will be attacked by scurvy. Modern knowledge has practically removed the dangers which in former times constantly attended ocean-going ships in this respect. Some idea of the ravages of scurvy may be gained from the losses sustained by Anson in 1740. The Admiralty, finding themselves short of fit men, ordered Anson to take with him 500 out-patients of Chelsea Hospital on his voyage to the South Seas, assuring him that these were "the properest men that could be employed on this occasion." Many of these elderly seamen escaped, but 259 were finally collected and marched on board. Not one returned. The "sea-scurvy" gripped them, their wounds reopened, their fractures recurred, and they died of wounds received a generation before. When Anson counted his men at Juan Fernandez he found that 626 had died out of a total of 961. It was Captain Cook who first realised the immense importance of fresh vegetables, fruit, and cleanliness, and much of his great success was due to the way he looked after his men. The moment signs of scurvy appeared he would fly from the Polar ice to warmer weather, and refit at some favourite island. Cook was fortunate in that Anderson, who in 1776 sailed with him as surgeon, appears to have been a very able man.

Dowlais, Glam.

FOOD POISONING AT CLITHEROE.—Between 50 and 60 cases of food poisoning, with one death, due it is believed to the consumption of potted meat-paste, have been reported to the health authorities in Clitheroe, Lancs, and neighbourhood. The first case was notified on Sept. 4th, the others in rapid succession. A representative of the Ministry of Health is investigating the outbreak.

Reviews and Notices of Books.

TUBERCULOSIS.

Tuberculosis in India: Its Prevalence, Causation, and Prevention. By ARTHUR LANKESTER, M.D., Officer for Tuberculosis, Government of India. London and Calcutta: Butterworth and Co. 1920. Pp. 317. 10*s*.

MANY books on tuberculosis give the impression that the author has set out on his task with that generous disregard for accuracy and detail which characterises the after-dinner speech. Dr. Lankester's book is in striking contrast to this type of literature; he has combined a great mass of detail with a broad and comprehensive survey of the main problems, and the result is a work which will prove a valuable source of information for many years to come. The author's task has evidently been complicated by his having not only to present new views and observations, but also to overtake and correct erroneous views. Writers on tuberculosis in the United Kingdom have glibly preached that in India surgical tuberculosis is rare, and that this purely fictitious state of affairs is due to the scarcity of bovine tuberculosis in India. Chevers in his "Diseases of India" declared that he had never seen a case of strumous cervical glands in a native of the plains of India. Dr. Lankester, on the other hand, has found surgical tuberculosis extremely common, and with regard to the relation of surgical tuberculosis to the bovine tubercle bacillus has found their coincidence very rare. In large areas surgical tuberculosis is prevalent, although infection from bovine sources can be definitely excluded. One of Dr. Lankester's most interesting conclusions is that the freedom from tuberculosis enjoyed by cattle in India may be due to a natural resistance, and that it is possible by careful cross-breeding to convey this comparative immunity to other stock.

Although this book contains material collected under the auspices of the Research Fund Association of the Indian Government, the Association is in no sense responsible for the opinions expressed, which are those of Dr. Lankester alone. Having spent 23 years as a medical missionary in India he has brought to his task an intimate knowledge of the sociology of the country, and the value of his scientific appreciation of the peculiarities of the tubercle bacillus is greatly enhanced by his knowledge of its host. On such a subject as compulsory notification, for example, he speaks with authority, and he remarks that in Bombay, where tuberculosis has been a notifiable disease since 1903, notification has been practically a dead letter. In 1913, the notifications of phthisis numbered 84, while the total number of deaths from tuberculosis in this year was 2152. "Consumption is so much feared now in Indian homes that there is a great tendency to conceal its advent, thus the family doctor notifying a case would do so often against the wish of his clients and would lose them at once .... notification in India as far as private practice is concerned may be regarded as almost non-existent." Compulsory regulations do not make sanitation more acceptable to the people; and ".... in India, where every form of compulsion carries in its train the possibilities of unlawful oppression by subordinates for the purposes of gain, it becomes of special importance to reduce this feature in our campaign to the smallest minimum." In many such passages Dr. Lankester shows an intimate knowledge of human nature, and of the complexity of the problems of tuberculosis as they affect mankind.

Taschenbuch der Diagnostik und Therapie der Lungentuberkulose. Third edition. By Dr. H. GERHARTZ. Berlin: Urban and Schwarzenberg. 1921. With plates. Pp. 296. M.72.

THE most prominent feature of this compact little book is the remarkable tidiness with which the author has arranged its contents. All information capable of tabulation is most conscientiously tabulated; a table

of remedies for fever gives in different columns information as to name of drug, its composition, its formula, and dosage. In another table an attempt is made to classify the numerous preparations containing creosote and guaiacol; another table shows the reader what drugs to use for night sweats. Another table is an admirable summary of the various skin diseases due to the tubercle bacillus, showing the usual site, the appearance of the lesion, and giving hints as to the differential diagnosis; yet another gives much concentrated information as to the various tuberculins, serums, and other specific remedies. Lists are given of health resorts, showing the nature of their climates and the particular tuberculous conditions for which they are best suited. A further section of this work deals with first-aid to the over-treated consumptive, treatment for atropine and morphine poisoning, for example, being described. Much space is devoted to orthodox methods of examination and treatment, and no reader can fail to be impressed both by the wealth of information and the small compass within which it has been condensed. Here and there the author commits himself to such a sweeping generality as: "Atypical forms of phthisis invariably have an unfavourable prognosis." But, on the whole, his information is as truthful as it is full.

SEXUOLOGY.

A Young Girl's Diary. Translated from the German by EDEN and CEDAR PAUL. London: George Allen and Unwin, Ltd. 1921. Pp. 271. 12*s.* 6*d.*

THERE has recently been a change of attitude towards the discussion of sex matters, particularly in regard to venereal disease, concerning which men and women of dignity and position give support to propaganda which, a few years ago, would have been excluded from the pages of any newspaper. In this connexion the need for education of the adolescent is fully recognised; further, it is well known that withholding sex information from the child results in that information being acquired in fantastic form from unclean sources. Few people deny this, but custom is strong and there often exists between parent and child a barrier as strict as any taboo of primitive people.

"A Young Girl's Diary" (which we assume to be authentic, though the literary detective might find room for question) shows us what happens on the child's side of the barrier. The writer belonged to the pre-war upper middle class in Austria, and the diary presents an intimate record of school-girl doings and confidences; through it runs one theme—the pursuit of forbidden knowledge—accompanied by furtive speculation shared by school-mates, talks with crudely informed domestics, searches in encyclopædias, pride when some point is cleared up, fantastic ideas of married life and strange theories about venereal disease. If the power of taboo will allow us to admit that we also were the victims of the conspiracy of silence there is very little, except a "Peeping Tom" episode, that would not be acknowledged as having happened to many of us in childhood.

The diary shows how the barrier, originally erected by the parent, is carefully maintained by the child, who uses deceit and cunning to prevent intrusion by grown-ups into secrets shared only by chosen intimates. Many incidents described are of particular interest to students of child-life; to parents still guided by old custom the book will bring home what may be happening in the minds of their supposedly ignorant offspring. There is a danger, however, lest some people may judge that the taboo was in need of reinforcement and that the writer of the diary was an evil-minded girl who should have been punished for wanting to know.

The most thought-provoking thing in the book is a publisher's slip limiting its "study" to members of the educational, medical, and legal professions. It is not easy to understand why parents belonging to trades or other professions should not read it

Monographien zur Sexualwissenschaft. I. Band: *Sexual-Physiologie.* II. Band: *Sexual-Psychologie.* Von Dr. med. H. ROHLEDER, Sexualarzt in Leipzig. Hamburg: Paul Hartung. 1921. Pp. 104 and 100. M.12.50 each.

Onanie und Homosexualität. Second edition. By Dr. WILHELM STEKEL. Berlin and Vienna: Urban and Schwarzenberg. 1921. Pp. 528.

1 and 2. Dr. Rohleder, a sexuologist practising in Leipzig, gives in two manuals a good outline of the physiology and psychology of the human sexual life, showing himself sometimes an idealist, at others a materialist. Thus he believes in desire for offspring as a component of the sexual impulse, but follows Steinach's hormone theory of its source perhaps rather too readily. For while no contradiction of the striking animal experiments of this worker has been made, yet their application to human subjects, and his histological and pathological specimens, have lately been impugned by competent judges. The practitioner consulted on problems like sexual prematurity, sex-instruction, sterility and impotence, nymphomania, and so forth, will find here a safe and interesting guide. One must except, however, masturbation, as to which this sexuologist notoriously takes up an extreme attitude. According to the statistics he himself quotes, moderate masturbation in adolescence is very widespread; in fact, an English public school physician is mentioned as giving a percentage of 92. When, after this, onanism is styled a sexual disease worse than syphilis or gonorrhœa, to be combated as vigorously as they are, one is astonished at the tricks a clever man's mind can play him.

3. The mischief actually done by this barbarous attitude is impressively shown by Dr. Stekel, the leader of a section of the Freudian school, in his full and highly individual work. The large majority of medical men will be interested and convinced by his demonstration of the thesis that infinitely more harm has been done by preaching against masturbation than by the practice itself. The second and larger part of his book is a comprehensive psycho-analytic study of sexual inversion. On the larval forms of this abnormality much light is thrown; for instance, well-known phobias, as against syphilis or tubercle, are shown sometimes to symbolise dread of inversion in a bi-sexually disposed subject. Like every investigator of genuine vocation, the author is especially interested in ætiology, and here defends the psycho-genetic theory against the doctrine (of Steinach and Hirschfeld) of physically determined sexual intermediate forms. He does not deny the existence of these latter, though rating their significance lower than does his master Freud. It may be illogical to argue from therapeutics to ætiology, but nevertheless if inversion is claimed as the result of an avertable psychical maldevelopment, then one looks with interest to the success or otherwise of its psychical treatment. The benefits described are not striking, except in one case, specially mentioned as occurring in a race very susceptible to suggestion. This is in accord with the verdict of Hirschfeld, a clinician of unrivalled experience, who has for some time decried psycho-analytic cures of inversion.

Die Geschlechtskälte der Frau. Second edition. By Dr. WILHELM STEKEL. Vienna: Urban and Schwarzenberg. 1921. Pp. 490. M.96.

The Beloved Ego. By WILHELM STEKEL, M.D. Authorised translation by ROSALIE GABLER. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1921. Pp. 237. 6*s.* 6*d.*

1. MANY of us were once familiar with a text-book in which we read, concerning anomalies of sexual feeling: "The reserve which properly attends this subject prevents scientific investigation of it." Only by realising that the scientific approach to any subject necessitates a complete absence of 'reserve' can one become reconciled to Dr. Stekel's frank and sometimes brutally honest book, in which he devotes nearly 500 pages to the study of sexual frigidity in women. The wealth and significance of his material compel the

admission that he has shown the importance of his subject, and has enriched clinical medicine. Dr. Stekel regards an increase of frigidity and of male impotence as a characteristic of the higher types of cultured people, confirming the view of some English writers that the relative infertility of our upper classes is due to other causes than deliberate restriction of pregnancy. With cultural development purely sensual love has become complicated by motives and tendencies of more subtle nature, which Dr. Stekel analyses with results surprising in their variety though conforming as a rule to psycho-analytical theory. To this theory he gives general adherence, whilst boldly attacking, modifying, or elaborating it in accordance with his personal views, as when, on page 172, he says that the ideas of infantile fixation have been grossly exaggerated and distorted to caricature by the school of Freud, or when he makes the criticism (pp. 221 et seq.), concerning a case treated for a long time by psycho-analysis, that the current sex trouble had not been discovered by the analyst.

The clinical value of his work is in the demonstration of the intimate and frequent association of serious "nervous" disorders with disturbance of the normal sex life, and he accepts with resignation the histories his patients give of long sanatorium "cures" for crippling disorders—hysterias, anxiety states, or compulsory ideas—with neglect of the underlying cause. We cannot, either as scientific men or as healers of the sick, shirk the admission that a great amount of nervous illness is bound up with intercurrent sex difficulties. Dr. Stekel's evidence is not obtained by esoteric psycho-analytical methods, but by simple investigations that can be carried out by any practitioner who has the necessary courage; his teaching in this respect is not new, but he offers such proof that we must either accept his conclusion or reject his clinical histories as unreliable.

Frigidity may be dependent upon causes peculiar to the patient, such as infantile fixations upon another member of the family, early experiences, the idea of self-punishment, the building up of a spurious love as a revenge upon a parent or former lover, or the fear of one's own desires; in short, upon any one of a multitude of causes. But Dr. Stekel makes the generalisation that the ultimate conflict is between "The will to power" and "The will to submission," with a refusal to sacrifice the personality to the demands of sex, a refusal upon which depends the whole modern attitude of the sexes towards each other and to society. "The patients hide 'I will not' or 'I dare not' under 'I cannot.' The unveiling of the 'Inner no' is the task of the psycho-analyst. . . . Sex difficulty shows us the progressive dissociation of civilised man, his division into a 'Willing' and a 'Not-Willing,' his inner tearing-asunder, his play-acting before himself and his battle with himself."

Dr. Stekel's independence and disregard for orthodoxy render useless any criticism of such statements as that on page 460: "There is no doubt whatever that an anti-sexual instinct has developed." Yet one would like to know what he understands by an instinct, for a definition is important even from his point of view. His material has a sociological value; the analyses of unhappy marriages, with the unfolding of the underlying causes, should be studied by all who feel called upon to pass judgment on the ever-increasing number of divorces.

While the material can be commended, the deductions expressed in the last chapter remain a matter for the individual judgment of each reader. They are ultra-feminist and iconoclastic, and the most ardent advocate of divorce reform in this country is left far behind by Dr. Stekel. One regrets that he opens battle on so wide a front; his clinical material is so valuable that it should be separated from views which, whether justifiable or not, are inacceptable to most English readers.

2. The "Beloved Ego" is a book of a totally different kind, containing less reference to sex than one finds in a family newspaper. Although the publishers describe it as "an excellent introduction to the study of psycho-analysis" it is really a psychological study of human error and weakness, and rather a conclusion than an introduction. A vigorous personal note prevails, and, since his thesis is a plea for recognition and guidance of all human desires, Dr. Stekel would perhaps unhesitatingly admit that in the preface his own beloved ego reveals its own self-love and will-to-power. He uses the neuroses to illustrate human failings—the double motive, the fears and doubts of "half-men," the kinship of love and hate, the pleasure that the unlucky dog obtains from his looked-for misfortunes—and confirms the suspicion raised by his other book that in his treatment there is much urging of the patient along the hard road to health, for in this analysis of the failings of mankind he shows more insistence than sweet persuasion.

A short study of "Mali-Mali" (the Malayan neurosis which we call *latah*) is typical of his handling. In this disturbance of the psychic life the sufferer must imitate the person under whose influence he falls; but we cultured people hide our weaknesses and attribute to free-will much which is only the effect of Mali-Mali. Mali-Mali shows us a common human phenomenon under the caricature of neurosis.

Dr. Stekel is a disturber of the peace, but he disturbs it with a cheerful breeziness and an easy style; accepted views are assailed from unexpected quarters, and every page is provocative. How far his philosophy is a legitimate development of psycho-analytical principles is open to question; his views often come near to those of Adler or even Nietzsche though the author's personality will never allow him to be merely the interpreter of the findings of other people.

The lay demand for psycho-analytical literature has led to a flow of books, good and bad; Dr. Stekel's "Beloved Ego," originally published in 1913, was written because he had something to say. In the two books just reviewed he draws a clear line between what the public may be expected to digest and what is requisite for a technical dissertation: psycho-analysis will benefit if this distinction is maintained.

THE LAW OF BIRTHS AND DEATHS.

A Study of the Variation in the Degree of Animal Fertility under the Influence of the Environment. By CHARLES EDWARD PELL. London: T. Fisher Unwin, Ltd. 1921. Pp. 192. 12*s.* 6*d.*

THE author's sub-title gives a clue to the object of his book, which in its main title is totally misnamed. There is no pretence at a study of mortality, and the author himself appears to have realised, at any rate by the time he reached p. 192, that his thesis concerning the fertility of females by no means deserves the dignified title of a law. This thesis is quite adequately summarised on p. 70 as follows:—

"The variation of the degree of animal fertility in response to the direct action of the environment will be directly proportional to the intensity of the nervous charge until the optimum-point for fertility is reached; it will thenceforward bear an inverse proportion to the intensity of the nervous charge."

It will be seen that the application of this "principle," as the author calls it, depends upon a measurement of the "intensity of the nervous charge." If the reader looks hopefully for some new device for measuring this charge he is fated to disappointment. "The nature of nervous energy" says Mr. Pell, "is very obscure," and we confess that a perusal of the chapter devoted to this subject, and derived very largely from "The Physiology of Bodily Exercise," by Fernand Legrange, does not do much to relieve the obscurity. Starting from so conveniently nebulous a conception it is not difficult to discover the "principle" which derives from it at work in the animal and vegetable kingdoms.

But Mr. Pell has done a service in drawing attention to a subject which badly needs investigation. It is probable, as he says, that the use of contraceptives is an insufficient explanation for large reductions in the birth-rate. A recent article by Mr. Knud Stouman[1]

[1] Internat. Jour. of Public Health, 1921, July-August, p. 417.

on the repopulation of France, in which he shows the existence of definite areas of low birth-rate whose influence spreads outwards like the growth of a cancer in all directions, opens up a promising field for sociological investigation. The biological line of approach suggested by Mr. Pell is also worthy of consideration, but it cannot be carried on independently of experimental research. And if we may be permitted one last word of advice it would be to refrain from a too unkind exposure of the want of expert knowledge in other workers in this most technical field. Even a member of the National Birth-rate Commi-sion might hesitate to draw his statistical data from the columns of the daily press.

THE EUGENIC PROSPECT: NATIONAL AND RACIAL. By C. W. SALEEBY, M.D., F.R.S. Edin., F.Z.S. London: T. Fisher Unwin, Ltd. 1921. Pp. 239. 12*s.* 6*d.*

Dr. Saleeby has paid another visit to America and has reinforced the inspiration and revelation of his previous visit. The result is a series of vigorous essays, written in his well-known popular style, on a large variety of topics ranging from the "decay of parenthood" to a eulogy of skyscrapers. He is greatly impressed, as indeed every liberal-minded visitor to the States must be, with the practical idealism of Americans. One could wish, however, that his stories of successful reforms were garnished with a few more of the practical details which so shrewd an observer must undoubtedly have gleaned. We are told, for example, that in Pittsburgh before the days of the Bureau of Smoke Regulation the pneumonia death-rate was the highest in the world. But we are not told how much the death-rate has been reduced nor what the minimum is to which smoke production has been reduced—only that it is now less smoky than Nottingham, which, after all, is a matter of judgment (not of soot records), and might even be considered a matter of opinion. The essays are thoroughly up-to-date, and while the reader may not always agree with the teaching, he must always admire the lucid and forceful manner with which it is presented.

JOURNALS.

Journal of Physiology. Edited by J. N. LANGLEY, D.Sc., LL.D., F.R.S. Vol. LV. 1921. Nos. 3 and 4. Cambridge University Press. Pp. 159–304. 12*s.*—The Regulation of the Reaction of the Blood, by C. Lovatt Evans.[1]—The Recovery Process of Excitable Tissues, Part II., by E. D. Adrian. By means of the capillary electrometer experiments were made to find out the relation between the decline of the electric response and the return of excitability in different tissues.—The Physiology of the Veins, by J. F. Donegan. The author's experiments were directed chiefly to comparing the effects of nerve stimulation on different veins, and to determining the course and origin of the veno-motor nerves, and the extent of central control and reflex effects. The methods used are described. The veins of the animals investigated (dog, cat, and rabbit) can be roughly divided into three groups. (*a*) The superficial veins returning blood from the skin. These receive sympathetic fibres. The veins of the hind limb receive them from the second to the fourth lumbar nerves inclusive, and chiefly by way of the seventh lumbar and first sacral ganglia, those of the fore limb from the sixth to the eighth dorsal with cell stations mainly in the stellate ganglion. They react differently in different individuals; in some they contract on the first weak stimulation, in others they only contract after repeated stimulation. These veins were not found to react to the usual vascular reflexes, but probably they take part in temperature reflexes. (*b*) The mesenteric veins are also supplied with sympathetic nerve fibres which have their cell stations in the ganglia of the solar plexus and the inferior mesenteric ganglion. They are influenced reflexly in the same way as the arterioles. (*c*) As to the veins from muscles and the vena cava, no effect was found in these. Adrenalin, 1 in 1,000,000, causes contraction in the veins of groups (*a*) and (*b*), but is practically inert in those of group (*c*).—The Survival of Motility in Mammalian Spermatozoa, by C. G. L. Wolf. This paper is the outcome of investigation in the School of Agriculture, Cambridge, and is one of great significance, bearing as it does on a problem of much practical importance in animal breeding—viz., the possibility of being able to keep spermatozoa viable for a sufficient length of time, so that they may be transported and used for distant insemination. Up to now it appears that artificial insemination has been practised only with semen immediately after ejaculation, or at most, an hour or two after passage. The author investigated the conditions under which survival could best be prolonged. Wolf states that it is known that mammalian spermatozoa remain viable outside the male organism for periods up to 20 days, so that it ought to be quite possible by providing a suitable environment to keep them potent for some considerable length of time. The author's experiments were made on the epididymis of rabbits, to determine the effect of adding buffer salts to a solution of the Locke type. Experiments made to fecundate rabbits with spermatozoa which had been kept in salt and glucose solutions were unsuccessful, but it would appear that rabbits are very unsatisfactory animals for artificial insemination. It was found that the motility of rabbit spermatozoa can be preserved for at least nine days by placing the juice of the epididymis in a Tyrode solution which can be buffered and to which glucose has been added. Oxygen is passed in and a suitable amount of sodium bicarbonate added. The preparation must be kept at a temperature near the freezing point of water.—Studies on Respiration and Circulation in the Cat: II., The Effects of Hæmorrhage and Transfusion of Gum-saline Solution, by Y. Doi. When the blood pressure of a cat is lowered to various levels by progressive bleeding, the amount of oxygen taken in by the animal and its minute-volume of blood flow through the lungs decrease with a fall of blood pressure. The first fall of blood pressure from the normal height has greater effect on the minute-volume per millimetre than the subsequent drop. When the blood pressure falls to a low level the decrease of the amount of oxygen taken in is less than that of the minute-volume. The frequency of respiration and pulse-rate increase with a fall of blood pressure, and the volume of each respiration and of each heart beat decrease with a fall of blood pressure. When the blood pressure is lowered by hæmorrhage, injection of Ringer's solution or gum-saline solution raises it to normal height, and increases to normal values the amount of oxygen taken in and the minute volume. Gum-saline solution sustains these conditions for a longer time than does Ringer's fluid.—The Function of the Urinary Tubules in the Frog, by Mildred Atkinson, G. A. Clark, and J. A. Menzies. The authors conclude from experiments made by the perfusion method that urea, sodium sulphate, and glucose are filtered through the glomerular membranes, that the cells of the tubules are capable of transmitting urea and sodium sulphate, but not glucose, from perfusing fluid to urine, and that these results are not altered by the presence of 2 per cent. gum in the perfusing fluids, but the gum prevents the occurrence of œdema in the kidneys.—The Effect of Cooling Power of the Atmosphere on Body Metabolism, by J. A. Campbell, D. Hargood-Ash, and Leonard Hill. The technique is described and experiments are recorded showing the effects of out-of-door and indoor conditions upon metabolism. It is considered that basal metabolism of the body cells is raised by cool out-of-door conditions, and that shivering is not necessary to raise metabolism. The metabolism is controlled by cooling power, not by temperature. Formulæ are suggested for rapid calculation of heat production of the resting subject under comfortable indoor conditions and under cool out-of-door conditions. It is considered that the former may possibly afford important information regarding

[1] See THE LANCET, Sept. 10th, p. 572.

patients with fever.—Experiments on the Regulation of the Blood's Alkalinity, by J. S. Haldane.[1]—The Action of Diuretics, by Arthur R. Cushny and C. G. Lambie. Diuretic drugs may act directly on the kidney itself, or indirectly through changes in the blood or in the circulation. Among the diuretics examined the increase in the urine appeared to depend directly on the blood flow through the kidney in only one instance—pituitary extract. Under caffeine the diuresis begins before the accelerated flow and lasts long after it has become normal. Its action is not dependent on changes in the blood, but on changes in the renal cells. The simplest view of the action of this drug is that it causes diuresis by reducing the resistance to filtration through the glomerular capsule by a specific action on its cells. The diuresis of salts and urea is not necessarily accompanied by acceleration of the blood flow, though this may accompany it in the beginning, and presumably favours its occurrence. Adrenalin lessens the blood supply and thus the secretion of urine, while section of the splanchnic nerve has the opposite effect in increasing the blood flow through the kidney and the amount of urine. Strophanthin had no diuretic action, nor did it alter the circulation through the kidney in moderate doses, while larger ones increased the blood pressure, slowed the renal blood flow, and lessened the secretion of urine. Rabbits anæsthetised with urethane 1·5 g. per kg. were employed.—The Coagulation of the Blood, Part II., The Clotting Complex, by H. W. C. Vines. According to this author, the inauguration of blood coagulation depends on the presence of a complex in which three substances are combined: a lipoid, calcium, and a protein. The lipoid and the calcium are essential. The calcium-lipoid combination does not yield calcium ions. The function of the protein is apparently secondary; it seems to render the lipoid compound more sensitive and may act by keeping the latter in a state of fine suspension. The compound described has properties resembling those of the thrombokinase of Morawitz rather than of the prothrombin of Howell.—The Effects of Respiration of Oxygen on Breathing and Circulation, by L. Dautrebande and J. S. Haldane. The authors sought to determine, by themselves breathing oxygen and air from two Douglas bags, whether there is any fall in alveolar CO_2 pressure when oxygen at increased partial pressure is breathed. They conclude that respiration of oxygen, particularly at increased barometric pressure, increases the breathing and diminishes the pulse-rate.—The Comparative Atrophy of the Skeletal Muscle after Cutting the Nerve and after Cutting the Tendon, by A. Lipschütz and A. Audova.

British Journal of Ophthalmology. July–September, 1921.—In the July number Colonel R. H. Elliot discusses the yielding of the optic nerve-head in glaucoma. The lamina cribrosa is derived partly from the scleral tissue and partly from neuroglia. Its density and its exact distribution vary considerably. Moreover, the density of the lamellæ is by no means necessarily uniform in different parts of the nerve-head. These points have been elaborated by Fuchs of Vienna, and the present paper is mainly a comment on his work. Its practical bearing on the formation of the glaucoma cup is important and the anatomical findings go far to explain the variations from the typical glaucoma cup of the text-books which are so frequently found. Light is also thrown on the meaning of the various forms of paracentral scotoma which are found clinically.

In the August number W. H. McMullen and M. L. Hine record some cases of chronic progressive ophthalmoplegia externa developing during childhood. They say that no very sharp dividing-line can be drawn between these cases and congenital cases on the one hand and cases developing in later life on the other. "All may be due to an 'abiotrophy' or 'lack of inherent vitality' of the specialised cells of the cranial nerve nuclei involved, the time of onset depending on the degree of vitality with which these cells were originally endowed."

In July and August Basil Graves describes a new instrument for contact-illumination in the examination of the cornea and anterior part of the eye. In using the corneal loupe the detection of fine changes is often rendered difficult by the reflex of light from the corneal surface. The contact-illuminator gets rid of this difficulty. For examination of the cornea it is placed on the scleral margin so that the illumination is lateral. One of the claims made for the instrument is that it is an aid in the early diagnosis of glaucoma, revealing a slight corneal haze after the instillation of cocaine when the tension is in any degree raised—a haze to be distinguished from that of cocaine drying which, as is well known, attacks the corneal surface when the lids are allowed to remain open after a too liberal use of the drug.

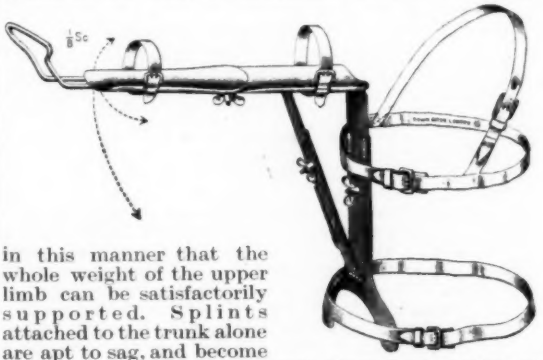
In August and September S. L. Ziegler discusses the Ocular Menace of Wood-alcohol Poisoning, on which we comment elsewhere.

The September number is largely taken up by an article by Priestley Smith on the Eye of the Ox and its Internal Blood-vessels. It is most beautifully illustrated by 46 figures from microphotographs of injected specimens taken by Mr. Frederick C. Lowe of Wednesbury.

New Inventions.

AN ADJUSTABLE ABDUCTION SPLINT FOR THE SHOULDER.

THIS splint is intended for use in all cases in which it is desired to abduct the shoulder-joint. Originally designed for use after dislocation, it has been found serviceable in paralysis of the deltoid from any cause, and after various injuries about the head and neck of the humerus, fractures included. The splint takes its "lift" off the pelvis, instead of off the soft tissues of the chest or abdominal wall, as it is only



in this manner that the whole weight of the upper limb can be satisfactorily supported. Splints attached to the trunk alone are apt to sag, and become ineffectual. In standing at rest, the natural method of supporting the weight of the arm consists in placing the hand on the hip, and this is imitated by a small length of malleable metal, suitably curved, resting upon the iliac crest, and kept in position by a web band passing round the bony pelvis, at the same level as a truss-spring. The only other attachment consists in a Y-shaped band which passes above and below the opposite shoulder. The splint is adjustable for either arm; the range of abduction varies between half a right angle and a right angle and a half; the height can be adjusted; the elbow can be left free, or fixed at any desired angle by a butterfly nut; the wrist and hand are supported by a bar of copper wire which can be lengthened or shortened as required, and bent to any angle. Normally the splint is made of thin sheet-iron, and its weight is not irksome. For special cases, it is made of duralumin, a light but strong alloy of aluminium. Messrs. Down Bros. are the makers.

ALAN H. TODD, M.S., F.R.C.S., B.Sc.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 17, 1921.

Additional Benefit.

INSURANCE against ill-health has long been second nature among the salaried classes, and the principle is becoming familiar among the wage-earners, for the first National Insurance Act is now just ten years old. Medical benefit has, indeed, been much criticised both by those who give and those who take, but there is ever less talk of abolishing it and more talk of extending and improving the general practitioner service. We may hopefully picture this extension and improvement as a continuous process without being sanguine enough to expect to see so-called medical benefit covering the whole range of additional services conveniently summed up in the Dawson report, at all events in the immediate future. The hospitals cannot do much, for they are bankrupt, or nearly so. The State has made a small and promising essay in the shape of regional medical officers, and is now obliged by the economy campaign to draw in again. Both heads of the stream from which the funds for an extended service were to come having dried up, the position would be desperate were it not for one blessed fact: that while the understanding on the part of the great industrial community of what health means has been growing, and the demand for its realisation has been becoming more insistent, the ability to provide it for themselves has arrived. No one who looks at the improved standard of food, of clothing, of comfort, and of pleasure among the great majority of the industrial population can doubt that they are in a position to secure the same standard of health if they regard it as worth the outlay. Mr. JOSEPH GRIFFITHS, in his thoughtful contribution to the hospital problem which we print on p. 633, states in so many words that the working classes are now in a position to provide a hospital service the like of which the world has never seen.

Nor is this any vague and unpractical dream. A provident scheme embodying these additional benefits has already taken shape in Brighton and the neighbouring part of Sussex, and our readers are familiar with its main features [1] as also with the further proposal to adapt the scheme to the needs of the metropolis.[2] And during the last week-end the final step has been taken of bringing this National Provident Scheme for Hospitals and Additional Medical Services before a larger public. The experiment is to be launched on Nov. 1st at three London teaching hospitals, apparently, for the first time in history, working in conjunction with one another. From the point of view of the patient coming within the income limits defined in the schedule—£250 a year for an individual, £500 for a family—the scheme offers so many patent advantages that the secretariat at 77, Cambridge-terrace, Paddington, may expect to be overwhelmed more by applications than by inquiries. Were it not for its credentials the leaflet reads more like a rosy company prospectus than a serious business proposition. But the signatories of the circular letter, who form the organising and executive committee, are actually in a position to announce a scheme to which the public can subscribe in the confidence that, if miscalculations have occurred or if unforeseen circumstances should make the services more difficult to render, the promises will still be faithfully carried out, and it will not be the subscriber who will have to bear the inconvenience, friction, or temporary loss that may result. Members of the executive committee have carried through enterprises even more complicated and momentous with success. An annual subscription of £1 or £2 a year, without preliminary medical examination, is a small premium to insure an individual or a family against all expense involved in consultations and special treatment of all kinds, to say nothing of home-nursing. As there will be no entrance fee, a subscriber who leaves London forfeits at most the remainder of his current year's subscription. Arrangements have been made with the Sussex Provident Scheme whereby members of the National Scheme may enjoy Sussex benefits should occasion arise during a temporary sojourn in the county, and this concession may be prophetic of a network of areas throughout the country, coöperating at least enough for a change of residence to involve only a change of institutions and consultants available.

Certain minor services will be specially valued. Since the dental surgeon in attendance upon a member may arrange for consultations at the dental department of any of the coöperating hospitals, it follows that the presence or degree of pyorrhœa, which can often only be ascertained by means of X rays, will be detected in doubtful cases, much ill-health and perhaps some teeth being saved thereby. Queen's and other visiting nurses will attend subscribers within the Metropolitan police area at the request of the medical attendant. Few of those eligible for membership have room for resident nurses, and economic conditions have driven to permanent work that "surplus female" whose real function in the community was just such emergency nursing. Appreciation of this boon must ultimately lead to a large increase in the staff of non-resident nursing institutions. Last year there were only 1954 Queen's nurses spread over the Kingdom, and the total staff of district nurses available, say, for Paddington and Marylebone numbered 12, and for Chelsea, Pimlico, and Belgravia only nine; but these figures take no account of overlapping, nor of the new class of patient who will now be attended. A few points unexplained in the circular have interest for the doctor. Individual consultations may apparently be arranged at any of the coöperating hospitals—the London, St. Thomas's, the Royal Free—but in the case of members living in the four-mile area unable to leave their beds, will the choice of the consultant be conditioned by distance, by convenience, or by the selection of the family practitioner? Presumably, as in the Sussex scheme, consultants outside hospital work will receive some but not full fees for their opinion, and an especially popular member of a staff might find himself overwhelmed with new work. Old students of the coöperating hospitals will doubtless be among the first to act as agents for the National Provident Scheme among their patients, since they know and trust the staff of their alma mater. This alone should ensure the success of the scheme.

[1] THE LANCET, Feb. 5th, 1921, p. 292.
[2] THE LANCET, May 14th, 1921, p. 1057.

Some Toxæmias of Pregnancy.

NUMEROUS theories have been advanced in explanation of the ætiology of the toxæmias of pregnancy, but none of them has as yet met with any general acceptance, and the problem must be regarded as still unsolved. The possibility of maternal intoxication by fœtal protein has attracted some investigators, and attempts, mainly unsuccessful, have been made to produce anaphylactic shock in the pregnant animal by injections of fœtal serum. Others have regarded damaged or infarcted areas of the placenta as the source of the toxin, and have drawn analogies with the action of poisonous products derived from degenerating muscular tissues, as seen in wound shock. Of possible toxic products of fœtal metabolism we have as yet no definite knowledge, nor do we know to what extent fœtal metabolism throws additional strain on the maternal excretory organs. That such additional strain is thrown upon certain maternal organs in pregnancy is suggested by the work of HERRING, who found a marked increase in weight of the liver in pregnant rats, the kidneys, on the other hand, showing no hypertrophy. In the absence of any definite knowledge of the ætiology of the condition, no rational method of prevention is possible, and we can only hope that, by a study of the functional condition of the organs mainly affected in the toxæmias, we may be able to prevent danger to the mother. From a clinical standpoint, it is of the utmost importance to decide at what stage a pregnancy complicated by albuminuria, or other indications of toxæmia, should be terminated. Though recent advances in pathological chemistry have contributed greatly to our knowledge in many fields of medicine, they have not as yet aided us appreciably in our diagnosis or treatment of the toxæmias of pregnancy. The subject is reviewed by Dr. O. L. V. DE WESSELOW in the current issue of *Medical Science*, and modern work on acidosis, and on hepatic and renal function in eclampsia and albuminuria complicating pregnancy is summarised. The theory that the condition is caused, or at least accompanied, by an acidosis—a theory which originated with ZWEIFEL, who believed that the causative factor was an over-production of lactic acid by the fœtus—has not been confirmed by later work. There does not appear to be any great reduction in the alkaline reserve of the maternal blood, as estimated by its combining power for CO_2. Though the liver lesions are so striking a post-mortem finding of the disease, we know of no definite alterations in the chemical composition of the blood or excreta which we can ascribe to failure of liver function, except the abnormal distribution of the urinary nitrogen. As is well known, the percentage of total nitrogen excreted as urea is frequently found to be much reduced in eclamptic cases, and this has been regarded as evidence of failure of the urea-forming mechanism of the liver.

The work of FOLIN and DENIS suggests, however, that there is an efficient extra-hepatic urea-forming mechanism, and STADIE and VAN SLYKE found in a case of acute yellow atrophy that, despite almost complete destruction of the liver parenchyma, a large proportion of urea was still formed. Chemical methods of estimating the functional capacity of the liver are at present so unsatisfactory that from a clinical point of view they may be disregarded. In testing renal efficiency we are on firmer ground, but here, too, the results in eclampsia have been disappointing. The marked accumulation of urea and other nitrogenous waste products, so frequently seen in acute and certain types of chronic nephritis, is absent in the toxæmias of pregnancy. The non-protein nitrogen and urea of the blood are frequently within normal limits. This absence of definite nitrogenous retention is indeed one of the most characteristic features of the disease, and serves to differentiate the true eclamptic from cases of uræmia due to chronic interstitial nephritis complicating pregnancy. The blood urea in the toxæmias of pregnancy is therefore of no value in prognosis. The urea-concentration test is probably more valuable in following the course and estimating the gravity of the condition, but the available data are at present scanty. The absence, until recently, of labour wards in our general hospitals, and the difficulty of keeping the healthy expectant mother under continuous observation probably account for the numerous gaps in our knowledge of the physiology of normal pregnancy and parturition. Even the relatively simple problem of the nitrogenous metabolism in pregnancy has attracted comparatively few investigators, nor have we much definite information as to the amount of protein necessary for the diet of the expectant mother. German experience, during the years of the war, suggests that the undernutrition of the population led to a marked fall in the incidence of eclampsia. Of the effects of the lowered standard of living on the weight of the infants at birth we have seen no statistics. It is to be hoped that the development of the antenatal clinic will lead to further study of the physiology of normal pregnancy.

Much may be hoped from the coöperation of physiologists and clinicians. Prof. V. J. HARDING's work on the subject of nausea and vomiting in pregnancy, recorded in THE LANCET of August 13th, was the outcome of a suggestion made by a physiologist, Prof. V. H. MOTTRAM, as a result of his observations on the mobilisation of fat during hunger, pregnancy, and early lactation in animals. Prof. MOTTRAM found: (*a*) that a day's hunger was sufficient to double the amount of fat in the liver, (*b*) that a marked fatty infiltration of the liver accompanied pregnancy and early lactation, and (*c*) that this last was more marked in timid animals, or in those which had just left the dealer, than in normal and well-fed animals. It therefore occurred to him that the ketosis of nausea and vomiting in pregnancy was due to fat mobilisation, and that to stop this mobilisation a diet containing large amounts of carbohydrate was indicated, together with the removal, if possible, of any unpleasant emotional state which would result in a glycæmia or glycosuria with a concomitant mobilisation of fat. The work is a particularly good illustration of the value of the application of physiological thought to a medical problem, and there was no obvious practical application of the original research at the time that it was done. Further than this, the nausea and vomiting in the early months of pregnancy is so nearly a physiological phenomenon that many who suffer, suffer gladly, believing it to be a sign that their infant will be strong; and even when the discomfort is considerable they may be impatient of treatment, believing the vomiting to be a natural event. The fact, however, that the condition lends itself to a simple and efficient treatment will be a boon to many, and the good results obtained by Prof. HARDING, and others who have followed his teaching, will encourage real scientific investigation of other conditions that are on the borderland of physiological and pathological states. It has been accepted by some observers that the vomiting of pregnancy is a neurosis, and this view has received some support from the fact that it is sometimes readily and immediately controlled by suggestion. Prof. MOTTRAM's observations also throw light on this aspect

of the question, and it is to be remembered in this connexion that many activities that result from a physical process of excitation can be arrested by suggestion. There is, for instance, the well-known fact that the sneeze which ordinarily follows the sniffing of pepper up the nostril can be inhibited against the patient's will, by contra-suggestion. If Prof. HARDING'S important work stands the test of time it may point to a more rational explanation of some conditions that are at present apt to be dismissed as neuroses.

Medical Education and the Rockefeller Foundation.

IN a review of the work done in 1920 by the Rockefeller Foundation, its president, Mr. GEORGE E. VINCENT, surveys achievements truly called world-wide. This review, taken along with the appended programme for 1921, shows that the minds directing the activities of the Foundation are sensitive to the change of attitude as to the scope of medicine which is gradually gaining ground in civilised countries. Public interest, while increasingly concentrated on the science of disease, is shifting towards its application to the prevention of ill-health. The doctor is now being called upon to keep his clients well, and while no part of his old training may safely be omitted, the new outlook adds greatly to his present responsibilities. The consequences for the training schools are fundamental. Recognising that modern medical education can no longer be maintained on a commercial basis, the trustees of the Foundation take the view that it is an essential social task for which private or Government aid must be provided. In no more fundamental way could the Foundation have contributed to progress than by helping strategically placed medical schools in various parts of the world to increase their resources and to improve their teaching and research. Seeking to fulfil its chartered purpose to promote the well-being of mankind throughout the world, the Foundation, among other good works during 1920, aided six medical schools in Canada; gave a large sum—eventually to be 5,000,000 dollars—to University College, London, for building and endowment; appropriated a million francs for the Queen Elisabeth Foundation for Medical Research in Belgium; agreed to contribute towards the complete rebuilding of the medical school of the University of Brussels; continued to construct and to maintain in Pekin a modern medical school with a pre-medical department; besides helping 31 hospitals in China to increase their efficiency. Moreover, it gave support to the School of Hygiene and Public Health of the Johns Hopkins University, continued to contribute towards a campaign against yellow fever in South and Central America, and gave financial and scientific aid to the prophylaxis of malaria and hookworm disease, as well as to many other medical enterprises—the whole involving an expenditure of over thirteen million dollars.

The campaigns against yellow fever and malaria are described in some detail. Once the scientific basis of malaria control is well established in any district there is ample opportunity for experiments testing various practical measures under different conditions. Apart from other well-known methods of preventing the deposition of the eggs and growth of the larvæ of the anopheles mosquito and of their destruction, in certain regions where water is abundant resort was had to "policing" the water by fish, as it was found that if the streams are dammed to form lakes the "top minnows" prove an effective ally. Each minnow consumes about 165 large mosquito larvæ a day, and appears to eat the mosquito eggs as fast as they are laid. A still more novel method was adopted in Louisiana, where the grasses on the banks of the stream form a protected zone in which eggs may be deposited beyond the reach of the top minnows. In order to clear away these grasses the strips along the "bayou" or sluggish stream are turned into pasture land on which cattle are allowed to feed. The cow crops the grass close along the low banks, and leaves the larvæ a prey to the eager minnows, the appetites of minnow and cow working together for the protection of man. To all these experiments, to medical science and practice in general, and especially to educational institutions, the Rockefeller Foundation plays the part of fairy godmother, giving due encouragement to such immediate schemes of public health as may be called paying concerns, but reserving her best gifts for the higher education of the doctor, in which lies the chief help for the future. It is the wide and comprehensive outlook on the medical problems of the world, even more than the immense sums at its disposal, which makes the Rockefeller Foundation an international potentate.

The Health Committee of the League of Nations.

THE Health Committee of the League of Nations has just held its first meeting at Geneva, and has submitted to the Council its recommendations for a new health organisation. The members of the committee are as follows:—

Dr. Léon Bernard, professor of hygiene in the University of Paris; Dr. G. S. Buchanan, senior medical officer of the British Ministry of Health; Prof. A. Calmette, director of the Pasteur Institute in Paris; Dr. Carozzi, medical director of the International Labour Bureau; Dr. Henri Carrière, director-general of the Swiss Public Health Service; Sir Havelock Charles, president of the Medical Board for India; Dr. Chodzko, Minister of Health for Poland; Dr. Lutrario, director-general of the Italian Public Health Service; Dr. Th. Madsen, director of the State Institute of Serotherapy at Copenhagen; Prof. Miyajima, of the Kitasato Institute for Infectious Diseases, Tokio; Dr. Pulido, president of the Spanish Royal Council of Public Health; Mr. O. Velghe, director-general of the Belgian Public Health Service; Prof. C.-E. A. Winslow, director of the League of Red Cross Societies.

Although elected on their personal qualifications, the committee will be seen to be nationally as well as professionally representative. Ten of the members already belong to the Committee of the Office Internationale d'Hygiène Publique. The acting medical secretary, Dr. E. J. Steegmann, of the British Ministry of Health, is retiring after two years' work of preparation in favour of Dr. Rajchman, of Warsaw, who has been appointed permanent medical director.

BRITISH ORTHOPÆDIC ASSOCIATION.—A meeting of this association will be held on Sept. 24th and 25th at the Shropshire Orthopædic Hospital, Oswestry. On Sept. 24th, at 9.30 A.M., executive proceedings of the Association will take place, and at 10 A.M. visitors will be shown round the hospital by the staff. Sir Robert Jones will conduct an out-patient clinic. Mr. Naughton Dunn will give a demonstration of treatment of calcaneo-cavus with cases, casts, and X rays. Mr. D. McC. Aitken will demonstrate plaster work. Mr. G. R. Girdlestone will speak on bone-grafting for tuberculosis of the spine in children, showing cases. In the afternoon visits will be paid to after-care centres in Shrewsbury, Oswestry, and Wellington. On Sept. 25th, at 10.30 A.M., operations, as cases permit, will be performed by Sir Robert Jones, Mr. Girdlestone, Mr. Aitken, and Mr. Dunn.

Annotations.

"Ne quid nimis."

CARBON MONOXIDE IN COAL-GAS.

TWENTY years ago it was agreed that in view of the imperfect state of the gas fittings in the poorer houses of urban districts the only effective method of preventing danger from leakage was to fix a limit which the carbon monoxide should not exceed. After passage into law last year of the Gas Regulation Act, a departmental committee was appointed by the Board of Trade to consider whether it was necessary under present conditions to continue to enforce any such limitation. Sir William Pearce, M.P. (chairman), Dr. T. Carnwath, Mr. William Doig Gibb, and Mr. T. Gray, D.Sc., were the members of this committee, which has just brought in its report. Dr. J. S. Haldane in his evidence before the committee thought that in view of the improved forms of gas burners now constructed the maximum percentage of carbon monoxide in lighting gas for domestic use might be increased to 20 per cent. without undue risk. This would allow the admixture with coal-gas of one-third blue water-gas or one-half carburetted water-gas. The advocates for no limitation based their case on the advantages of cheap gas, especially for heating and cooking. The committee, after weighing carefully all the facts concerned, concluded, on the balance of advantage to the public, by recommending non-limitation. Increased risk from the poisonous nature of carbon monoxide was not, they thought, serious when all practicable precautions were adopted. The danger of increased death-rate was in any case of small dimensions and against this must be set the unquestionable improvement in the public health by the reduction of smoke and fog owing to increased use of gas. The economic advantages following the use of water-gas were proven and they were greatly impressed by the necessity of allowing the development of the gas industry to proceed without any check on its natural progress. The committee suggested, however, that the departments concerned should carefully watch the situation so that, should freedom from limitation be accompanied by unfavourable results, the attention of Parliament might again be directed to the matter. All the witnesses heard by the committee agreed that the distinctive odour of coal-gas is a necessary precaution, and the committee suggested that it should be made an offence to supply any gas for domestic purposes which does not possess the distinctive pungent smell of coal-gas.

The committee was assisted in coming to this decision by the experience of the Public Health Service of the U.S.A. communicated in a letter from Surg.-General H. S. Cumming to Dr. G. S. Buchanan. From this it may be seen that the composition of illuminating gas at Washington, D.C., described as a "straight water-gas," is as follows:—

	Per cent.		Per cent.
CO_2	4	CH_4	13·6
Illuminants ..	11	H	38·4
O	7	N	3·5
CO	28·7		

which may be taken as fairly representative of the average composition in the U.S.A. From their experience it would seem that the use of water-gas presents great economic advantages, and that the presence of anything up to 30 per cent. of carbon monoxide has not proved prejudicial to the public health. The poisonous character of illuminating gas is apparently well understood in America, and householders are prompt to remedy small leaks. In view of all the evidence in regard to carbon monoxide, it is not believed in America that any danger can result from leaks of gas so small as to be imperceptible to the sense of smell so long as an amount of illuminant adequate to give it a strong odour is added to gas. This last point is, of course, essential.

A MEDICAL PHYSIOLOGIST.

THE Society for Experimental Biology and Medicine has issued a Memorial Number for Samuel James Meltzer, M.D., its founder and first president in 1903. The number consists of addresses by various members of the Society setting forth the services of Meltzer to the Society itself and to the great part played by him in shaping and hastening the development of scientific work in the United States and more especially in New York which, a few years before, "as a scientific centre was pretty bleak and barren." Meltzer was born in Courland, Russia, on March 22nd, 1851, was educated at Königsberg, and then studied philosophy and medicine in Berlin between 1875 and 1882, where he came under the influence of the great masters of medicine and of physiology—Du Bois-Reymond, Virchow, Leyden, Frerichs, Traube, Helmholtz, Koch, and others. In Berlin he had the good fortune, while a student of medicine, to attract the notice of the late Prof. Hugo Kronecker, who at that time was assistant to Du Bois-Reymond, and they jointly in 1881 published a classic memoir on the "Process of Swallowing," giving an entirely new interpretation, now known as the Kronecker-Meltzer theory, of deglutition, which has since been generally accepted. The friendship begun in Berlin lasted throughout the life-time of both master and pupil. Meltzer was a distinguished promoter of the application of experimental methods to research in American medicine; he inspired fidelity to truth and stimulated achievement, more especially in younger men. He began practice in New York in 1883 but did not give up his physiological outlook, and he endeavoured throughout to bring his experimental facts to clinical application. With the foundation of the Rockefeller Institute he was chosen to direct the division of physiology and pharmacology, giving up practice at considerable financial sacrifice. His productivity was remarkable, extending to over 240 papers on physiology, pharmacology, pathology, and clinical medicine. His views on the part played by inhibition in the general activities of the body were much in advance of those of his earlier contemporaries. The border-land between medical science and medical practice was his special field of work, and he brought about a helpful and sympathetic understanding between the laboratory worker and the physician. It was he who called attention to the fact that reflex excitation of the inspiratory muscles is accompanied by reflex inhibition of the expiratory muscles, and vice versa, and he went on to suggest that a similar relationship must prevail in the case of all antagonistic muscles such as the extensors and flexors of the limbs. He thus led up to the convincing demonstration given ten years later under the term "reciprocal innervation" by Sherrington.

In Meltzer's later years he published several papers on the action of adrenalin upon the blood-vessels and pupillary muscles, showing that the temporary action of adrenalin upon the blood-vessels may be converted into more lasting effect in the blood-vessels of the ear if those blood-vessels are first denervated by section of the vasomotor fibres in the sympathetic and third cervical nerves. In the mammal, injection of small doses of adrenalin have no effect upon the size of the pupil, but if the superior cervical ganglion be excised, then after a time a moderate dose of this drug brings on a marked and long-lasting dilatation. Incidentally, Meltzer was led to use the pig's eye as a biological reagent for the detection of small concentrations of adrenalin. His last extensive series of researches dealt with anæsthetisation and artificial respiration through pharyngeal and intratracheal sufflation. Meltzer kept in touch with progress in almost all branches of experimental medicine, his sympathies being very broad. He represented the physiological type of physician and was one of the few earlier physicians—S. Weir Mitchell and W. T. Lusk were two others—in the United States whose practice was based upon physiological training, aptitude, and interest. Meltzer died on Nov. 7th, 1920, and his

memory will be a continuing inspiration, not only to members of the Society for Experimental Biology, but to all those who are now endeavouring to link up medicine more closely with physiology.

MOUNTAIN SICKNESS.

INTEREST in mountain sickness has been recently stimulated by the discussions in the press regarding the expedition which is to attempt to reach the summit of Mount Everest, the highest peak of the Himalaya Range. It is a well-known fact that travellers ascending to high altitudes suffer from a series of symptoms, varying in different individuals, but generally comprising shortness of breath, palpitation, prostration, and a disinclination for exertion; at still greater heights the symptoms may be more severe, and may include loss of appetite, nausea or vomiting, cramps, drowsiness, giddiness, a throbbing headache, loss of mental power, and great bodily exhaustion; occasionally there are hæmorrhages from the nose, eyes, or mouth. All these symptoms are aggravated if the ascent be made in stormy weather, or when the air is saturated with moisture. The causes of mountain sickness have been variously attributed to diminished barometric pressure, deprivation of oxygen, heart failure, or undue fatigue. A combination of these causes may operate at times, but most authorities are now agreed that the chief of these causes is deprivation of oxygen.

Considerable light has lately been thrown upon the subject by Captain R. W. G. Hingston, I.M.S., who, while attached to an expedition despatched by the Survey of India to the Western Himalayas and the Pamir Plateau, made a series of careful and detailed observations, the results of which he has published in the last issued number of the *Indian Journal of Medical Research* (Vol. IX., No. 1) under the title of "Physiological Changes at High Altitudes and their Relation to Mountain Sickness." This malady affects people in different ways and at different altitudes, but a person ascending from a low altitude to a high one can become acclimatised to the requirements of the greater height. Nature comes to the rescue by developing an increased number of red corpuscles to provide the body with additional oxygen-carriers to meet the altered circumstances of the rarefied air. Mountain sickness, therefore, is associated with an insufficiency in the number of red blood corpuscles which are necessary at higher altitudes to convey oxygen to the tissues. When the ascent is slow and gradual there is a rapid manufacture of the corpuscles. At sea-level an ordinary person has, in round numbers, about 5 millions of these corpuscles in every cubic millimetre of his blood, and this number is sufficient to deal with the available oxygen, which at that level is about one-fifth of the air breathed. When, however, the traveller ascends to 7000 feet, the barometric pressure is reduced by about one-quarter, and the oxygen available is only three-quarters of the amount that was available at sea-level. When a height of 18,500 feet is reached, the available oxygen is halved, and it is calculated by Captain Hingston that anyone arriving at the top of Mount Everest, which is 29,000 feet high, would only have at his disposal a third of the oxygen to which he had been accustomed at sea-level. Continued examinations of his own blood and that of other members of the expedition showed that when a man by slow and gradual ascent attained an altitude of 8000 feet, his red blood corpuscles had rapidly multiplied from about 5 millions to 6, and that when a height of 13,000 feet had been reached the number of these corpuscles had risen further to 7½ millions. An ascent to 18,203 feet, the highest point attained, and a residence there for about two days showed that in his own blood the red corpuscles had increased to 8,320,000.

The facts observed by Captain Hingston confirm the observation, well known in lesser degree in the European Alps, that an ascent from a low to a high altitude is associated with a definite and continuous change in the constitution of the blood, the result of the stimulus which rarefied air exerts on the blood-forming mechanism of the human body. By this means the individual can adapt himself to the higher levels if the ascent be made slowly and gradually, thus allowing the production of a sufficient number of oxygen-carrying corpuscles. This manufacture of red corpuscles is by no means slow; for instance, in one observation a short stay of two days at an altitude of 13,000 feet showed an increase of about 725,000 in the number of these corpuscles per cubic millimetre of the blood. It is possible that there may be a limit to this power of the body to compensate for great altitudes, but it will be noted that the process was in active operation in Captain Hingston's case at a height of 18,200 feet above sea-level. The blood of the natives of the Pamir Plateau, habitually living at an average height of 13,500 feet, was carefully examined, and it was found that the number of red corpuscles in the blood of the average adult native was 7,596,000 per cubic millimetre, as compared with 7,402,000 in Captain Hingston's own blood at that level. It is further of interest to learn that during descent from high to low altitudes, when the stimulus of the rarefied air was withdrawn, there was a gradual reduction in the number of the red corpuscles, though the rate of decrease was not so rapid as the rate of increase had been during the ascent. After a short residence at sea-level the number of red corpuscles had fallen to normal—namely, a little under 5 millions. These observations supply an illustration of the wonderful power of the human body to adjust itself to changes in its environment, and that man may become acclimatised to an atmosphere containing only a half of the oxygen-supply to which he has been accustomed. Finally, Captain Hingston expresses the belief that individuals might with care gradually adapt themselves to a region where, as at the summit of Mount Everest, they would find only one-third of the oxygen which is available at sea-level.

THE WEST INDIAN MEDICAL CONFERENCE.

THE recent West Indian Medical Conference at Georgetown was the seventeenth of its kind,[1] and the first to be held in British Guiana. The acting Governor, the Hon. C. Clementi, stated in the course of his inaugural speech that the declining population of the colony, as contrasted with the increasing populations of Trinidad, Jamaica, and Barbados, was due to climatic and sanitary conditions, which are sufficiently explained when it is realised that "the only area now colonised in British Guiana is a partially reclaimed swamp, four feet below high spring tides." Representatives of the London School of Tropical Medicine were present at the Conference, having gone to the colony to investigate the causes of filariasis. The deliberations lasted a fortnight, papers with a wide range of subjects being read and discussed. The formation of a West Indian medical school was strongly advocated, and other topics of discussion were the possibility of a central medical service, the safeguarding of the health of the immigrant population, the status and training of nurses, infant welfare work, and the advisability of the appointment of a sanitary commissioner, free from local control, who might form a link between the various colonies concerned, the Colonial Office, and the London School of Tropical Medicine. The resolutions passed by the Conference and forwarded to the acting Governor also included references to the following points: Provision of pure water-supply, efficient drainage, control of mosquitoes, and stringent enforcement of public health regulations; introduction of a suitable proportion of meat into the diet of the labouring classes, hitherto almost exclusively vegetarian; control of midwives, registration of still-births, and confidential notification of miscarriages and abortions; adoption of routine school medical inspection;

[1] THE LANCET, August 20th, p. 419.

educational propaganda concerning venereal diseases,[2] and provision of free treatment; and notification and permanent segregation of cases of leprosy. Special attention was paid to the various West Indian tropical diseases, and to the necessity of research in that connexion. The main impression to be gathered from accounts of the Conference is that, given the necessary financial means, the medical profession, working with the sanitary engineer, and having sufficient intelligent lay support, can render the West Indies perfectly safe for the rearing of a healthy native-born white population.

THE ECONOMICAL STORAGE OF FOOD.

THE Food Investigation Board have now presented to the Committee of the Privy Council for Scientific and Industrial Research their report for 1920. As in previous years, the report is divided into sections, each section showing the work of a different committee of the Board, with a note appended naming the papers and reports published during the year, or in course of preparation, by the particular committee in question. In the introduction reference is made to the establishment, now nearly completed, of the Low Temperature Research Station at Cambridge, and to a long report upon the general theory of preservation of food by cold, prepared by Prof. Walter Stiles. During the year the Fish Preservation Committee have published an interim report upon the brine-freezing of fish; the Meat Committee have discontinued their work on the preservation of beef by cold pending completion of the Research Station, but have investigated the production of lactic acid in muscle and the cause of moulds occurring in cold stores. The Engineering Committee are now producing a report of investigations upon the flow of heat through walls and of the specific heat conductivity of various insulators. The Oils and Fats Committee have continued their studies of the unsaturated fatty acids and the constitution of artificial fats derived from the alcohol mannitol and from methyl glucoside. The Canned Foods Committee have completed a report on the effect of a diet of putrefying meat on the health of animals, and other reports on the chemistry and bacteriology of canned foods is in process. Of great interest is the work of the Fruit and Vegetables Committee, which falls into three main groups of investigations: (*a*) into preservation and physiology of living fruit after it is gathered; (*b*) into diseases of gathered fruit; and (*c*) into the chemistry of the ripening process, particularly the chemistry of pectin and the mechanism of destructive oxidation of tissues following injury to some fruits. Experiments are being conducted with two types of English apple in order to determine the best temperature and degree of humidity, the longest possible period, and the period most commercially profitable for storage, together with the effect upon the keeping properties of apples of the soil conditions to which the trees were subjected; various methods of packing are also being investigated, with the object of discovery of a method whereby the fruit may be packed once for all by the grower and only opened after sale; and an inquiry is proceeding into the comparative advantages of cold and "gas" storage. By the results so far obtained, a temperature of 1° C. with a humidity of 85 per cent. is shown to give the best preservative effects; clay soil is preferable to chalk for cultural conditions, and chalk to fen-land; wooden boxes are found more satisfactory for packing purposes than cardboard cases, and tissue paper wrapping of apples is desirable. The storage life of apples held in "gas" (concentration averaging 14 per cent. carbon dioxide and about 8 per cent. oxygen) was about twice as long as that of controls stored under ordinary conditions; a full report of the experiments will shortly be available. The investigation of the oxidising enzymes of fruit with special reference to discoloration has been completed, and it has been found that fruits can be placed in two classes. The first group is of fruits containing two enzymes, a peroxydase, an oxygenase, and a substance with the catechol grouping, and includes the apple, quince, pear, plum, cherry, peach, apricot, medlar, strawberry, banana, grape, fig, and mulberry; the second group is of fruits containing only a peroxydase, no oxygenase or catechol substance being detected, and includes the orange, lime, lemon, grape-fruit, raspberry, blackberry, red currant, black currant, gooseberry, pomegranate, pineapple, melon, and tomato. Copies of the report are obtainable at H.M. Stationery Office, Imperial House, Kingsway, W.C. 2. Price 1s.

[2] A summary of the report of the Western Commission of the National Council for Combating Venereal Diseases, dealing with the West Indian Colonies, appeared in THE LANCET, July 2nd, 1921, p. 55.

WOOD-ALCOHOL POISONING.

A GOOD deal has been heard in America on wood-alcohol poisoning, more especially since the adoption of the prohibition policy. The acute toxic symptoms which may be rapidly fatal are generally accompanied by blindness, partial or complete, or blindness may ensue in a case where acute systemic symptoms have been wholly absent. In cases that survive partial recovery of sight is not uncommon. Ziegler[1] believes that the primary and fundamental lesion in all cases is a profound injury of the pituitary body. "The changing but steadily contracting fields, the fugitive scotomata, the visual loss and recovery, the sclerosed or atrophied nerve-heads, the fixed and dilated pupils, the temporary paresis of the extra-ocular muscles, the ptosis, the ataxic gait and the mental hebetude are all characteristic of pituitary involvement." He records six cases in most of which recovery of vision took place. It is to be noted, however, that these are not recent cases, but all date from before the era of prohibition. The treatment adopted included the administration of alkalies and negative galvanism applied directly to the eye. A point worth noting is that the end-product excreted by the kidneys is formic acid and that this reduces Fehling's solution, so that a wrong diagnosis of diabetes is quite possible.

THE TREATMENT OF GASTRIC ULCER.

FEW medical problems to-day are so much a matter of controversy as that of the treatment of gastric ulcer; the opinion of so experienced a physician as Dr. Frank Smithies, Professor of Medicine at the University of Illinois, and for many years gastro-enterologist to the Mayo Clinic, is therefore of especial interest. In a recent paper[2] Smithies calls attention to the paramount importance of basing treatment on modern physiological and pathological knowledge. It is clear at the outset that no treatment can hope to give a high standard of results which neglects to deal with the primary focus of infection which lies at the root of the disease; and physicians often complain that surgeons tend too readily to perform drastic operations without at the same time seeking to eliminate readily accessible sources of infection. In deciding the criteria for surgical treatment Smithies states that, "unless ulcers with much scar, or causing great gastric deformity, are demonstrated to be luetic, little hope of permanent relief by medical measures can be offered"; extent, chronicity, and the tendency to hæmorrhage are the factors on which he lays stress as determining the advisability of surgical interference. In a disease requiring such prolonged medical treatment as must a chronic gastric ulcer, we are faced with the paradox of surgery being the more economical treatment. Having selected the cases, more recent and less extensive, suitable for medical treatment Smithies lays particular emphasis on the importance of securing true physio-

[1] The Ocular Menace of Wood-Alcohol Poisoning, by S. L. Ziegler, British Journal of Ophthalmology, August and September, 1921.

[2] International Journal of Gastro-enterology, July, 1921, vol. i., p. 13.

logical rest for the stomach; every student knows that rest in bed will save a damaged heart muscle from many thousands of contractions per diem, but few yet visualise the effect on a recent ulcer which must be produced by the 2000 peristaltic waves which accompany a normal meal. To secure such rest complete fasting with rectal feeding for a period of five days or more is advocated, with direct duodenal feeding by a tube as an alternative; when food by mouth is begun, liquid carbohydrate mixtures given frequently in small amounts are those which will provoke the minimum of gastric response. For treatment with drugs Smithies has little to say; many will disagree with his condemnation of alkalies, though most clinicians are now in accord in deprecating the use of sodium bicarbonate. It is interesting to observe that when discussing surgical treatment Smithies advocates pyloric closure in all cases operated upon; it is perhaps the multiplicity of surgical procedures adopted that makes judgment of results so difficult. In an important article on jejunal and gastro-jejunal ulcer, Hurst and Rowlands,[2] suggest that, "If gastro-jejunostomy were only performed when there is a visible ulcer or stenosis of the pylorus or duodenum; if before the operation every possible source of infection in the mouth and pharynx were removed; if at the operation any associated disease of the appendix or gall-bladder were dealt with; if after the operation the patient were given adequate instructions with regard to diet and told to take additional feeds between meals; if moderation in smoking and the taking of olive oil before meals and alkalies after were also enjoined; then the chances that a gastro-jejunal or jejunal ulcer might develop would be reduced to a minimum." Confirmation of these opinions is given by the experimental work[3] of Goto, of the Imperial University, Fukuoka, Japan; this worker, in an extensive series of experiments on dogs, has shown the readiness with which, apart from operative trauma, peptic ulcer may be produced in the intestine when septic foci are present and a highly acid gastic juice is left unneutralised.

FIMBRIAL CYSTS.

ACCORDING to Dr. Henry Cohen,[4] of New York city, who records two illustrative cases, fimbrial cysts which have previously been described as parovarian cysts are of very infrequent occurrence. Of 269 cases of ovarian cysts studied by Wiener only ten were examples of this kind. The most frequent complication is torsion, which may lead to gangrene. In five of Wiener's cases there was free fluid in the abdomen, but in none was there a severe peritonitis. Rupture, hæmorrhage, infection, and malignant degeneration were some of the other complications. Pregnancy was present in 11 cases. It is therefore obvious that a fimbrial cyst with torsion and gangrene and free fluid in the peritoneal cavity associated with pregnancy, of which one of Dr. Cohen's cases is an example, is an extremely rare occurrence, and no similar instance could be found in spite of a careful search through the literature. The relationship of these cysts to co-existing pregnancy is of interest both from a mechanical and physiological standpoint. Owing to the menace to life of both mother and child, fimbrial cysts, like ovarian cysts, should be removed as soon as the diagnosis is made. Numerous cases have been recorded to show that pregnancy may go on uninterrupted even when an operation on the ovary takes place before the fourth month. Nine of Wiener's cases were operated on before the sixth month with only one abortion, which occurred 11 days after a salpingo-oöphorectomy. In Dr. Cohen's second case, which occurred in a married woman, aged 23, the clinical picture simulated ectopic gestation, owing to the four cardinal symptoms of pain, missed period, vaginal bleeding, and the presence of a mass in the right fornix. On laparotomy a typical fimbrial cyst of the right side with a normal ovary and elongated tube was found. The tube, ovary, and cyst were removed and uneventful recovery took place.

[2] Guy's Hospital Reports, July, 1921, vol. lxxi., p. 319.
[3] Japan Medical World, June, 1921, vol. i., No. 2.
[4] American Journal of Obstetrics and Gynecology, August, 1921.

MILK FOR MOTHERS AND INFANTS.

CIRCULAR 234 of the Ministry of Health, issued on August 26th, has given rise to some anxiety. A previous circular (No. 185, March 31st) on the subject of the supply of milk by local authorities to expectant and nursing mothers and children under five expressed the view that many authorities were greatly exceeding desirable expenditure on this head. Circular 234 re-states the need for economy, and announces the reduction of the Treasury grant towards such expenditure from 50 to 5 per cent., the outlay in the financial year 1920–21 being taken as the basis on which to calculate this percentage. To comply with the demand for a 20 per cent. cut on expenditure the Maternity and Child Welfare Department was apparently faced with the alternative of economising on the milk grant or of allowing health visitors to be discharged, welfare centres and children's homes to be closed. Restriction of such activities must inevitably lower the standard of the work as a whole and belittle the value of the child welfare movement in the eyes of the public. Milk can still be provided in necessitous cases through the Poor-law; it can still be sold at cost price at welfare centres, where the difference between cost price and the sum the mother can afford to pay will afford a proper object for voluntary contribution. For the mothers dinners may still be provided. And, finally, it is open to authorities which consider there is special need for the distribution of free milk to obtain approval for expenditure in excess of that on which the grant will be paid. We may regret the hardship implied in the limitation and yet feel that the Department has sacrificed the least essential part of its work. The percentage basis, however, hits especially hardly just those local authorities which observed due economy in their expenditure of 1920–21.

SYPHILIS OF THE LUNG.

Dr. Udo J. Wile and Dr. Clement H. Marshall,[1] of the Department of Dermatology and Syphilology of the University of Michigan Medical School, remark that in syphilis of the lung, as in syphilis of the gastro-intestinal duct, in which the symptoms closely resemble those of any other gastro-intestinal disease, there is no characteristic clinical picture. It is therefore probable that the condition is more frequent than the clinical or pathological reports would suggest. Indications of the association of syphilis with pulmonary disease are to be found in the writings of Paracelsus, Cesalpinus, and Paré as far back as the sixteenth century, but the first anatomical description of pulmonary syphilis was given by Depaul in 1850, and the first clinical description in 1858 by Virchow whose article on white pneumonia is a classic. Prior to the publication of Koch's epoch-making work on tuberculosis in 1875 enormous numbers of cases of so-called pulmonary syphilis had been published, but after pulmonary phthisis had been recognised as tuberculous, reports of pulmonary syphilis ceased to appear for a considerable time. It is therefore probable that most of the cases reported up till then were those in which syphilis occurred in association with pulmonary tuberculosis or that they were examples of frank tuberculosis mistaken for syphilis. The present writers, from a study of the literature of the last 20 years and personal observations of cases in the University of Michigan Hospital, have come to the conclusion that there is a small group of cases in which there is presumptive clinical evidence of pure

[1] Archives of Dermatology and Syphilology, July, 1921.

syphilis of the lung. The pulmonary symptoms in these cases are either coincident with early syphilis or constitutional syphilis of other viscera in which prompt improvement or even complete disappearance of signs and symptoms results under anti-syphilitic treatment. According to the writers, clinical pulmonary syphilis may occur (1) as isolated gummas of the lung, (2) as diffuse syphilitic fibrosis, and (3) possibly as a diffuse broncho-pneumonia. Of these, gumma of the lung, though generally regarded both clinically and pathologically as extremely rare, is not so very uncommon as the initial stage of fibrosis followed by cavitation. The clinical picture depends entirely on the situation of the process and the stage of its development. Diffuse fibrosis or chronic interstitial pneumonia is the commonest form of syphilitic lung disease. The fibrosis in and about the bronchi gives rise to dyspnœa, coughing, and vascular changes leading to hæmoptysis. The occurrence of syphilitic broncho-pneumonia, which has been disputed by some authorities, is accepted by the present writers, as well as by Neumann, Fowler and Godlee, Fournier, Dieulafoy, Aufrecht, and others. The prognosis of syphilis of the lung may be said to vary with the time at which a correct diagnosis is established. In gummas and in the early stage of the fibroid type prompt institution of specific treatment renders the prognosis favourable, whereas the association of tuberculosis considerably aggravates the prognosis.

WE regret to announce the death, on Sept. 9th, of Sir Peter Freyer.

FACULTÉ DE MÉDECINE DE PARIS.—Special courses at the Clinique de Dermatologie et Syphiligraphie, Hôpital Saint-Louis, will be instituted during the autumn under the direction of Prof. Ed. Jeanselme. It is intended in future to hold two series of courses every year, one in October, November, and December, and the other in April, May, and June. Each series will comprise a complete course of dermatology and a complete course of venerology. The fee will be Fr. 150 for each course; the latter will begin each year on the second Monday in October and on the second Monday in April, at the Musée of the Hôpital Saint-Louis and at the amphitheatre of the clinic (Salle Henri IV.). Lectures and demonstrations will be held every afternoon from 1.30 till 4 P.M., the mornings being reserved for work at the Polyclinic, ward-visiting, out-patient consultations, &c. A certificate will be issued at the termination of a course. Those taking the course will register at the Secretariat de la Faculté de Médecine, Rue de l'École de Médecine (guichet 3). For all further information apply to Mr. Marcel Bloch, Chef de la Laboratoire à la Faculté, 40, Rue Bichat, Hôpital Saint-Louis, Paris 10e.

THE LONDON TOLL EXCHANGE.—The London Toll Exchange is now approaching completion and telephone subscribers should soon be able to make trunk calls extending over short distances with less delay than hitherto. Under the new system a subscriber wishing to call any provincial town within a distance of approximately 25 miles radially from the centre of London will ask for "Toll," instead of "Trunks." He will be connected to the London Toll Exchange, where the telephonist who answers him, besides recording particulars of the number, will herself establish the connexion to the desired subscriber. The General Post Office has issued a circular stating that the majority of such calls will be completed whilst the caller waits on the line, as in the local service. When a call cannot be connected on demand, owing to the lines being engaged, a subscriber's application will be booked and completed as soon as the telephonist is able to find a free line, when the subscriber will be rung up as in the case of a trunk call. At the date of opening the existing lines will be increased by 20 per cent., and the lines provided on the more important routes should be sufficient under present conditions for the immediate disposal of all traffic. The more important towns which will come within the operations of the London Toll service are: Ascot, Aylesbury, Bishop's Stortford, Buckingham, Dorking, Egham, Gerrard's Cross, Hatfield, Hertford, High Wycombe, Leatherhead, Luton, Maidenhead, Potter's Bar, Rickmansworth, St. Albans, Sevenoaks, Slough, Staines, Tring, Uxbridge, Walton-on-Thames, Watford, Weybridge, Windsor, and Woking.

ON THE

ORGANISATION OF A FRACTURE SERVICE.

BY HARRY PLATT, M.D., M.S. LOND., F.R.C.S. ENG.,

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SCHEMES for the efficient treatment of fractures have exercised the minds of surgeons for many years. War experiences have stimulated anew our surgical conscience in regard to this particular field of surgery, and it is now almost universally realised that in hospital practice the segregation of fractures in a special service or sub-service is an absolute necessity. Granted the fundamental principle of segregation, the actual details which go to make up an efficient scheme will tend to vary within wide limits according to local conditions. The scheme initiated by the writer at the Ancoats Hospital, Manchester, just before the war may be of some interest to surgeons in general, and to orthopædic surgeons in particular. The interruption of the war prevented the full development of the scheme, which has gradually assumed maturity during the past two years.

The Ancoats Hospital is a general hospital situated in a densely populated area, the majority of the inhabitants of this region being employed in some of the most important industrial organisations of the city. A considerable number of patients suffering from industrial accidents seek treatment at the hospital, and amongst these is found a steady flow of fractures; in addition, the hospital is called upon to deal with fractures occurring in individuals of all ages, not necessarily sustained in the course of employment. The surgical side of the hospital, to which 75 beds only are allotted, is divided into three services of equal size; one service, under the charge of the writer, is devoted exclusively to "orthopædic" surgery in its widest sense. The total accommodation for surgical in-patients is, however, not commensurate with the size of the out-patient clinics. Thus the orthopædic service alone has at all times a list of over 100 patients awaiting admission for operation. The number of fractures which can be admitted to the wards is therefore somewhat limited. But an average of 30 new fractures are dealt with each week as out-patients. All the fractures attending the hospital are treated in the orthopædic service. Patients reporting at the hospital for the first time are seen in the casualty department. Fractures of the lower extremity are admitted at once, if beds are available in the emergency wards, with certain exceptions—viz., the majority of fractures of the femur or of the bones of the lower leg in young children. Even in adults a certain number of simple fractures of the tibia and fibula are occasionally dealt with as out-patients, the Thomas splint being used as a routine. Upper limb fractures (simple) are temporarily splinted and referred for immediate radiographic examination. After receiving such first aid these patients are instructed to attend the special fracture clinic, which is held once weekly. The special fracture clinic is one of the three, weekly, out-patient clinics representing the out-patient department of the orthopædic service. The accommodation of the hospital at the moment precludes more frequent conduction of this clinic. In actual practice, however, it has been found that, having regard to the number of fractures attending the hospital, the one clinic a week is quite sufficient. Where for any reason a particular patient requires special supervision in the interval between the regular attendances, he is seen in one of the general orthopædic clinics.

The Fracture Clinic.

(*a*) *Surgical Staff.*—The clinic is under the immediate supervision of the senior surgical assistant of the

orthopædic service (orthopædic registrar). His chief assistant is a surgical registrar, who is also attached for out-patient duties to the "general surgical" services; a third medical officer is provided in the person of the house surgeon of the orthopædic service.

(*b*) *Records.*—The records of all patients attending the clinic are maintained on a special sheet and are kept in a special file separate from the general records of the orthopædic service. In order that adequate notes may be kept on each patient, two secretaries work in the clinic, taking down at dictation full detailed information of the history and results of the physical examination of new patients, and adding continuation notes on the records of old patients. From this department reliable statistics as to end-results should be available in the future.

(*c*) *Splinting.*—It has been found necessary, in order to deal with large numbers of patients at one session, to provide a sufficiency of assistants to the surgical staff, detailed for the special purpose of facilitating the application and reapplication of splints. One or more splint "teams," consisting of pupil masseuses who are under training in the hospital school of physio-therapy, and acting under the direction of the senior masseuse of the hospital, are in attendance. Where necessary, an additional team is formed by the out-patient sister and assistant nurses. In this way in the space of two and a half to three hours from 80 to 90 fractures are seen at the one clinic, and efficient primary splinting or readjustment of splints is carried out.

(*d*) *Physio-therapeutic Treatment.*—The orthopædic registrar in this hospital also holds the office of medical officer in charge of the physio-therapeutic department and its training school. He is thus able to control the patient suffering from a fracture throughout the course of treatment, from primary splinting to the final stage of mobilisation and re-education. This applies also to the senior masseuse and her pupil assistants, so that the arrangement is of considerable educational value to the school of physio-therapy. In this hospital there is thus more than a mere liaison between the orthopædic service and the physio-therapeutic department in regard to the treatment of fractures.

(*e*) *Methods.*—The question of the methods employed in the actual treatment in the clinic does not come within the scope of this article, but it may be said quite briefly that, as would appear from above, splints are used extensively. Plaster-of-Paris fixation is, however, occasionally employed for special purposes—e.g., where abduction of the shoulder-joint is required, or where difficulty is experienced in maintaining by splints the supinated position of the forearm. The splints used almost exclusively are the metal gutter splints of the Liverpool School. As has been mentioned, fractures of the femur or lower leg in younger children, and a certain number of fractures of the lower leg in adults, are treated on the Thomas splint with fixed extension, and such patients are transported from their homes to attend the out-patient clinic in common with the upper-limb fractures. The vast majority of the fracture cases, whilst continuing to attend the clinic, pass into the physio-therapeutic department by the end of the third week, and in a considerable number such treatment is begun within a few days from the time of the incidence of the trauma.

(*f*) *Teaching.*—It is considered that a clinic of this type is eminently suitable for the surgical teaching of both senior under-graduate and post-graduate students. The mass of material can be demonstrated without interrupting in any way the orderly working of the clinic, the actual teaching being in the hands of the surgical director of the service of which the fracture sub-service is a part, who, being able to delegate to others the supervision of the multitudinous details of staff-work, can devote his energies to instruction alone.

General Considerations.

The plan of allocating to one service or—to use a more individualistic British designation—to one surgeon all the fracture patients in a hospital redounds greatly to the credit of those surgeons who, in the interests of efficiency and progress, relinquish the care of these patients. In this connexion the writer is bound to express his appreciation of the whole-hearted coöperation he has received during the past seven years from his surgical colleagues at the Ancoats Hospital.

It is urged that in all general hospitals with not more than about 500 beds a single fracture service organised on similar lines to that which is the subject of this article will be adequate. In still larger hospitals the question of the duplication of this service will arise, but even for the largest general hospital not more than two services should be necessary. With regard to the widespread adoption of this principle of segregation of fractures, it is important to consider certain fundamental requirements. In the first place it is useless to "dump" a vast crowd of patients on to a particular surgeon, unless he is to be allowed a comparatively large staff of assistants, if possible chosen and trained by himself. Failing this provision the creation of a fracture service tends merely to propagate on a large scale all the deficiencies and blunders of the old scattered system. Further, no lasting advances in surgical organisation can be achieved if such a service is placed in a very subsidiary position by delegating it to the care of a junior surgical officer whose interest in fractures is of a temporary nature, and who is looking ahead to the days of promotion and to an active participation in some other surgical field. It is essential that the director of this department be a surgeon in full charge of a service at the hospital, and one in whose practice, teaching, and field of investigation the treatment of fractures will remain an integral part during the whole of his active career. If we are competent to visualise the future development of surgery, abroad and also in this country, we are compelled to affirm that the appropriate surgeon to be entrusted with the control of an ideal fracture service is that specially trained type of general surgeon who is justly accorded the title of orthopædic surgeon. Thus the fracture service of a hospital will naturally find its place as a department of a surgical service which deals with a field which, for want of a more accurate etymological term, is recognised all the world over as orthopædic surgery. This condition applies only to the choice of the director of the service; the surgical assistants can with advantage include junior surgeons whose connexion with the service will be one of a short term of years, and who are to be the future heads of general surgical services.

In a hospital where a second fracture service is deemed necessary, this will be controlled by the chief of one of the general surgical services who is prepared to devote the necessary time and interest to the direction of this work. It is unnecessary to elaborate the obvious economic importance to industry in general of the efficient treatment of fractures. Those who are engaged actively in this work are aware of the fact that employers, insurance companies, and trade-unions are alive to the necessity for reform.

FOOD EDUCATION SOCIETY.—The Food Education Society has issued an appeal for £20,000 to put its organisation on a firm footing, and to enable the many demands made upon its attention to be met in an adequate manner. The giving of cookery lectures, lessons, and demonstrations, participation in exhibitions and conferences, questions to Parliamentary and other candidates, and the publication and circulation of literature throughout the British Empire, are amongst the activities of the Society, which was founded in 1908, and has ever since that time been engaged upon a work proved to be of great national importance during the recent war, and remains an urgent necessity in the face of present financial and social crises. The small amount of capital belonging to the Society is now exhausted, and the public in general, together with social reformers in particular, are confidently appealed to for support. Donations and annual subscriptions should be addressed to the Hon. Treasurer, Sybil, Viscountess Rhondda, D.B.E., Food Education Society, Danes Inn House, 265, Strand, London, W.C. 2; cheques to the order of the Food Education Society, and crossed "Barclay's Bank, Ltd."

NATIONAL PROVIDENT SCHEME FOR HOSPITAL AND ADDITIONAL MEDICAL SERVICES.

THE LONDON SCHEME.

THE organising and executive committee of the National Provident Scheme, which consists of Sir Arthur Stanley, Lord Dawson of Penn, Sir Alan G. Anderson, Mr. W. McAdam Eccles, F.R.C.S., and Dr. J. F. Gordon Dill (Hon. Secretary), has issued an explanatory leaflet giving full particulars of the Scheme as applied to London.

The Problem.—The great and increasing cost and complexity of medical services beyond the attendance of a general practitioner have made it impossible for a large majority of the population to obtain full advantage of the progress of medicine, although it is obvious that many cases cannot be properly dealt with unless the doctor in charge has all modern facilities at his disposal. It therefore becomes a choice of either having to do without them or of accepting them wholly or in part as charity. Further, the voluntary hospitals are already obliged to charge for their services, and have to ask all their patients to contribute, as far as they are able according to their means, to the outgoing cost of their maintenance and treatment.

Hospital Coöperation.—But it has now been made possible, by the help and coöperation of the following hospitals, to meet these difficulties by the establishment of a Provident Scheme which will supply its members, *free of cost* (beyond their subscriptions as members), with practically all the highest resources of medicine which are available—viz., the London Hospital, St. Thomas's Hospital, and the Royal Free Hospital.

Scope of Scheme.—The Provident Scheme, it is explained, (1) has nothing whatever to do with the National Health Insurance or any other organisation for medical benefit; and (2) does not provide its members with ordinary medical (i.e., general practitioner) attendance, or other benefit to which they are entitled from the State or from local authorities, or under the National Health Insurance Acts; but (3) is for the benefit of those who, irrespective of class or occupation, are in a financial position which makes them eligible for election as members.

No preliminary medical examination is required before the admission of an applicant for membership.

Facilities Provided by the Scheme.

Except where otherwise stated, members will receive, *without charge* beyond their subscriptions to the Scheme, the following advantages:—

Consultations.—The medical attendant of a member may arrange, by appointment, for individual consultations at any of the coöperating hospitals, and such treatment as he and the consultant may jointly think advisable will be undertaken (at the hospital if this should be necessary).

For those members who are unable to leave their beds and who reside within a radius of 4 miles of Charing Cross, the services of visiting consultants may be secured by appointment. For members outside this area, but within the Metropolitan Police area, who are unable to leave their beds, free consultation may be obtained by appointment, subject to the payment to the consultant at the time of consultations of a charge of 10*s.* 6*d.* per mile (i.e., equal to one-half of the usual mileage rates) beyond the 4-mile radius.

Nursing.—The services of the "Queen's" and other visiting nurses will be available within the boundaries of the City and the Metropolitan Police areas for members at their own homes at the request of their medical attendants.

Dental Services.—(*a*) Treatment in hospital: Such dental treatment as may be considered necessary for a member whilst under medical or surgical care in a coöperating hospital. (*b*) Consultations: The dental surgeon in attendance upon a member may arrange by appointment for consultations at the dental departments of any of the coöperating hospitals.

Laboratory.—All the resources of the pathological laboratories of the coöperating hospitals will be available for the benefit of members after consultation, including bacteriological and pathological investigations and examinations beyond the province of general practice, Wassermann and Widal tests, &c., blood examinations and counts, the preparation of autogenous vaccines, &c.

X Rays.—Examinations (including opaque meals) will be available where found necessary after consultation, and a report will be supplied to the medical attendant of a member. Treatment by X rays will be given when, after consultation, it has been considered advisable.

Massage will be provided by appointment for members in whose cases it is prescribed after consultation.

Electrical Treatment.—i.e., galvanism, faradism, high-frequency, ionisation diathermy, &c. will be administered by appointment, after consultation, in suitable cases.

Hospital Treatment.—Urgent cases will be admitted to hospitals, as at present; other cases requiring operation or other hospital treatment will, after consultation, be admitted to hospital in due course, but a member will not take precedence over more urgent cases, and the ordinary hospital routine will not be disturbed. Members of the Scheme conforming to the rules will not be subjected to any almoner's inquiry or to any charge at the hospital.

Radium Treatment.—If, as the result of a consultation, it is decided that treatment by radium is necessary in the case of a member such treatment will be provided by arrangement with the Radium Institute.

Ambulances.—Will be available at the request of the medical attendant or of the secretary of a coöperating hospital for the transport of "stretcher cases" within the boundaries of the City and the Metropolitan Police areas.

Income Limit.

Persons insured under the National Health Insurance Acts are eligible for election as members of the Scheme without regard to income; but, in the case of all persons not so insured, limits of income to qualify for admission to membership of the scheme have been set out as follows:—

Group.	Description.	Limit of income of persons applying for membership (not insured under the National Health Insurance Acts).	Annual subscription.
I.—(*a*)	Single person over 16 years of age.	£250	£1 0 0
(*b*)	Widow or widower without children under 16 years of age or other dependents.		
II.—(*a*)	Married couples without children under 16 years of age.	£400*	£1 10 0
(*b*)	Single person with one dependent.		
(*c*)	Widow or widower with one child under 16 years of age or with one dependent.		
III.—(*a*)	Married couples with a child or children under 16 years of age or other dependents.	£500*	£2 10 0
(*b*)	Single person with more than one dependent.		
(*c*)	Widow or widower with more than one child under 16 years of age, or other dependents.		

For the purposes of the rules a person will be deemed to be a dependent who satisfies the Committee of Reference that he or she is living with and is wholly dependent upon the applicant for his or her support.

* In Groups II. and III. the above income limits have reference to the combined income of the persons in respect of whom application is made, and will be reducible as and when children pass beyond the age of 16 years or when dependency in the case of another member of the family ceases. Transfers from one group to another will otherwise be also rendered necessary from time to time, but (except in the case of children attaining the age of 16 years whose membership automatically lapses on the date of the sixteenth birthday) adjustments will only take place as from the expiration of any membership year.

Membership.

Cards of membership, bearing the date, will be issued for the first day of each month to those whose applications have been made during the preceding month, and the benefits begin on the date named on the card, and continue for one calendar year. These cards must be produced as evidence of membership. At the end of one year from the date of issue of the membership card the benefits cease unless the subscription has been renewed. Fourteen days' grace will be given for renewal (during which none of the services provided will be available). When the number of members has reached the limit of the capacity of the coöperating hospitals the list will be closed. In order that members may be fully assured of the promised services, and also that the capacity of the hospitals may not be strained, the committee have decided to limit very strictly the numbers of those admitted to membership. Applications from those wishing to join the Scheme will be dealt with in the order in which they are received until it is necessary to close the list.

All applications and inquiries should be addressed to the Hon. Secretary, 77, Cambridge-terrace, Paddington, London, W. 2.

BRITISH ASSOCIATION AT EDINBURGH.

SECTION OF PHYSIOLOGY.

THE Presidential Address was delivered by Sir WALTER M. FLETCHER, F.R.S., on

The Aims and Boundaries of Physiology.

This address, in abridged form, appeared in THE LANCET of Sept. 10th, p. 541. A new feature of this year's Association meeting was the discussion on the addresses of Sectional Presidents.

In opening the discussion Sir EDWARD SHARPEY SCHAFER, F.R.S., laid great stress on the fact that a divorce of the teaching of histology from that of physiology would be deplorable. Histology could only effectively be treated as an integral part of physiology, since all the real problems of histology were of a physiological nature. Nearly all the important advances in histology had been made in the course of physiological inquiries. Physiology must be regarded as a science of independent standing, and not merely as ancillary to the study of medicine; its truths were to be sought for their intrinsic scientific value, as the ultimate practical importance of any discovery could never be forecasted. Regarding the application of physiology to clinical medicine, and the recent tendency to summon the physiological expert to the bedside, Prof. Sharpey Schafer was of the opinion that this was impracticable. It was far more desirable for the clinician to so far understand physiology as to be able to apply its findings for himself, or else to be able to propound definite problems for solution in the physiological laboratory. This end could be achieved if young physicians would serve a term of apprenticeship in the Physiological Department similar to that customarily passed through in the dissecting room by their surgical colleagues.

Prof. A. KROGH said that in Copenhagen there were three chairs of Physiology, one in Human and General Physiology, one in Veterinary Physiology, and one in relation to Agriculture, and the arrangement worked well.

Prof. F. G. HOPKINS, F.R.S., drew attention to the importance of both analytical and synthetical methods in the study of all biological problems.

Prof. J. MEAKINS supported Prof. Sharpey Schafer, and was of the opinion that a wider instruction in physiology would be of great value to those practising clinical medicine, which was based on physiology; any great lengthening of the medical curriculum was, however, to be avoided.

Profs. A. D. WALLER, F.R.S., A. R. CUSHNY, F.R.S., J. S. HALDANE, F.R.S., and H. E. ROAF also spoke on the aims of physiological teaching in relation to practical medicine.

Kidney Deficiency Tests.

A discussion on the results of kidney deficiency tests in relation to the views on the functions of the kidney was opened by Prof. CUSHNY, who summarised the results of recent work on renal efficiency tests. In tests which depend on the determination of the relative concentration of some constituent—e.g., water, chloride, urea, sulphate, phosphate, or creatinine, in plasma and in urine—it was essential to distinguish between threshold and no-threshold substances. The first two-named above were threshold substances, and there was some recent evidence that urea was also in the same class: these substances were removed from the blood plasma until their concentration therein reached a definite limiting value. Urea when injected is only slowly excreted and is an unsuitable substance to use as a criterion of kidney efficiency. Sulphate, phosphate, or creatinine being no-threshold bodies—i.e., being finally completely removed by a normal kidney from the blood plasma—might be better. The method depending on the determination of urea content of the blood, which is normally 0·02–0·04 per cent., was unsatisfactory, because the limit of 0·04 per cent. was usually only exceeded when the kidneys were badly failing. In any case, determinations of any substances in the urine (sulphate, creatinine, or injected dyes) were almost useless unless the concentrations of these substances in the plasma was also known.

Prof. MEAKINS agreed with Prof. Cushny that considerable concentrations of urea could be present in the blood without producing marked symptoms. He then gave examples of clinical cases of chronic obstructions due to enlarged prostates, which tended to show that the secretion or retention of water, chlorides, and nitrogenous substances varied independently of one another. Nitrogen retention alone was not of great significance. A study of the volume of urine, and of the chloride and residual nitrogen of the plasma was often a useful guide to indicate whether operation was feasible or otherwise.

Prof. HALDANE was also of the opinion that urea was a no-threshold substance. As regarded the secretion of water, he thought that the kidney very accurately regulated the osmotic pressure of the blood plasma, but that its threshold value was abnormal when the kidney was subjected to back pressure.

Prof. P. T. HERRING showed photomicrographs which he believed indicated that in the kidneys of some lower vertebrates, at all events, the uriniferous tubules definitely secreted.

Prof. KROGH and Prof. T. H. MILROY also emphasised the opinion that urea was a no-threshold substance, and that urea was normally present in the tissues.

Dr. C. LOVATT EVANS suggested that an effect of obstruction and back pressure might be to cause local vascular changes in the kidneys, and thus to direct blood to different extents to portions of the uriniferous tubules of different functions, absorptive or secretory.

Dr. E. P. POULTON pointed out that in azotæmic nephritis, though urea was retained, chloride was not.

Sir J. MACKENZIE thought that too little attention had been given to the correlation between kidneys, skin, and bowel: further, that in nephritis some substances of unknown nature were retained and produced symptoms.

In replying, Prof. CUSHNY said that the effects of obstruction in producing alterations in urinary volume were almost certainly of a reflex nature.

Vitamins in Relation to Public Health.

Dr. J. C. DRUMMOND read a paper on the relation of vitamins to public health. The danger of an inadequate supply of these protective foodstuffs in the dietary of the working classes had by no means been overrated; their consumption of milk, fruit, and green vegetables was low, and much of their food had been subjected to unnatural processes of preservation. Most of the sources of vitamins were

among the more expensive articles of food, and an improvement in the quantity and quality of the milk-supply was much to be desired. Vitamins were not produced in animals, but were ultimately derived from green plants, in which they probably arose in large amount in the course of photosynthesis. A good example of this was seen in the recent drought; as the green food became more scarce the vitamin value of the milk was reduced, but after rain had restored the grass there was a rapid recovery. In cows fed on artificial foods, in winter also, the volume of milk was greater, but its nutritive (vitamin) value less than in summer. Some interesting details of the sources of cod-liver oil were described by the speaker, who had recently visited the Norwegian fisheries. Lofoten oil was obtained from the liver of the cod at spawning time (February and March); oil from the Finmarken area was obtained later (June), and was derived from the livers of various other species as well as from the cod. Both were equally potent. The potency of cod-liver oil was remarkable. 2 mg. of oil per day sufficed to supply a rat with vitamin A. If we remember that nearly all of this is fat, the active constituent must be present in minute amount.

Sir WALTER FLETCHER, in opening the discussion on this paper, remarked that the vitamins were a very good illustration of a most important practical subject which had had its beginnings in purely academic research. The cost of the experiments was heavy and should be borne by the State. It was unfortunate that under the Vivisection Act a special certificate had to be obtained to enable experimenters to feed an animal without an anæsthetic. All these large numbers of animals were well treated, but their numbers were returned and were quoted by anti-scientific societies and used for propaganda work.

Presentation to Sir E. Sharpey Schafer.

Prof. W. D. HALLIBURTON, F.R.S., on behalf of former pupils and assistants of Prof. Sharpey Schafer, now teaching physiology in all parts of the world, expressed their pleasure in congratulating him on his seventieth birthday. He, as one of Prof. Schafer's former students, had seen little change in the young and energetic teacher under whom he studied in 1878 at University College. A presentation in the form of a medallion was to have been made on this occasion, but was not yet completed.

Prof. SHARPEY SCHAFER, in replying, said that he was happy to say that all who had passed through his hands had remained his friends. He, as a former assistant of Sharpey, Burdon-Sanderson, and Michael Foster, had done his best to continue their work, and was happy to see the pupils of his choice still bearing the torch.

Other Communications.

Prof. KROGH (Copenhagen) described a spirometer method by means of which the oxygen consumption of man and animals could be determined. The method should enable determinations of basal metabolism to be made with ease and accuracy.

Dr. W. W. PAYNE and Dr. POULTON described experiments on patients by the balloon method of graphic recording of intragastric pressures, as used by Carlson, which indicated that epigastric pain was due to contraction of the walls of the stomach. Surface tenderness was probably a referred pain. Powerful contractions of the stomach, and also of the œsophagus, resulted when the stomach was distended with gas.

Prof. HALLIBURTON gave a lecture on giants, and dealt chiefly with the effects of hyperpituitarism in the entertaining manner which characterises all of his popular lectures. The subject of dwarfism was also dealt with by way of contrast. Lectures such as the one he gave are always popular at meetings of the British Association, and do much to increase popular interest in the fascinating problems of physiology and medicine.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

Health Insurance and Reorganisation of Hospitals.

Twenty-four deputies, including a number of prominent physicians, have elaborated the text of a Bill for the reorganisation of hospitals, for the adoption of a scheme for national health insurance, and a pension for disablement before old age, and have submitted it to the Commission d'Assurance et de Prévoyance Sociales. Sections 1 and 2 of the Bill create at the Ministry of Health a special department, l'Office National, consisting of technical men, physicians, surgeons, architects, and administrators thoroughly acquainted with hospital matters. Its members are to be elected by the Minister from names proposed by various scientific societies. The same sections of the Bill establish county offices working conjointly with the national office. Section 3 gives the function of each country office, which will investigate the need for the construction of new wings to existing hospitals. Such proposed extensions will be classified according to comparative urgency, and the office will censor the plans of any new building to be erected. According to Section 4 the expenses for the erection of buildings declared indispensable will be equally shared by the State, the administrative county, and the municipal borough. The other sections of the Bill deal with health insurance and pensions. Section 5 establishes the principle of a compulsory disablement and health insurance for all employees of both sexes whose salary is Fr.8000 or under. In Section 6 it is proposed that the benefit of the insurance shall not be claimable before the fifth day of the disease, but should the illness last more than ten days the patient would be benefited from the first day. In Section 8 it is suggested that the employer and employee should contribute equally towards the funds of the insurance, the contribution being for each of them 1½ per cent. of the salary, and that the State should contribute to the amount of 50 centimes for every franc. Under Section 10 medical benefit is to consist of medical treatment and attendance, including the provision of medicine and also of a daily unemployment allowance proportional to the salary. Section 11 provides that whenever the insurance doctor is of opinion that the insured person ought to be admitted to hospital, the latter will have to submit to his decision.

French Medical Profession and Inauguration of Pekin University.

On the occasion of the inauguration of the Pekin University in the course of this month Prof. T. Tuffier, of Paris, will, at the request of the Committee of the Rockefeller Institute, give three clinical lectures at the Union Medical College, and he has also been asked to perform a series of operations on three different days. On Sept. 17th Prof. Tuffier will deliver the inaugural lecture at the new university, the subject being Surgical Septicæmias and their Treatment.

International Congress of Hygiene.

The committee of the Propagande d'Hygiène Sociale et d'Education Prophylactique and the Société Française de Prophylaxie Sanitaire et Morale are organising an international congress for the propaganda of social hygiene by instruction on moral education and the prophylaxis of diseases, to be held in Paris during the last week of December, 1922. Mr. Paul Appel, Rector of the Paris University, will preside, and physicians, hygienists, moralists, and all those concerned with the education of the young are invited to the congress; it is hoped that a permanent scheme of action in the prophylaxis of diseases, and more especially venereal diseases, by scientific and moral education of the people, will be worked out. The preliminary programme is as follows: First section: general hygiene, tuberculosis, alcoholism, cancer; chairman—Prof. L. Bernard. Second section: venereal diseases and social consequences; chairman—

Prof. Ed. Jeanselme. Third section: prophylaxis of venereal diseases; chairman—Mr. L. Queyrat. Fourth section: instruction in sexual matters; chairman—Prof. A. Pinard. Fifth section: means of action, propaganda, legislative measures; chairman—Mr. J. Godart. Anyone seeking further information concerning the congress is invited to write to the General Director of the Congress: Monsieur Sicard de Plauzoles, 6, rue de Logelbach, Paris (17e).

International Congress for the Protection of Motherhood and Infancy.

An International Congress for the Protection of Motherhood and Infancy will be held in Paris on July 6th, 7th, and 8th, 1922. The programme of questions open to discussion is the following: Section 1: Protection of the mother before and during confinement. (*a*) Consultations during pregnancy. (*b*) Management of confinement at home. Section 2: Protection of mothers who suckle their children. Section 3: Protection of the infant when weaned from its mother. Section 4: Assistance and teaching. In the course of the meeting an International Association for the Protection of Motherhood and Infancy will be organised. Foreign societies are invited to send a delegate to express their opinion on the questions set forth. Individuals desiring to be present, as well as societies wishing to send representatives, are invited to communicate with the President, Union des Œuvres d'Assistance Maternelle et Infantile, 49, rue de Miromesnil, Paris.

Sept. 10th.

INDIA.

(FROM OUR OWN CORRESPONDENT.)

Vaccination in Madras Presidency.

THE campaign against small-pox has for many years been a very important part of the work of the Sanitary Department all over India. In the Madras Presidency, in fact, up till 1914 or later, the Deputy Sanitary Commissioner spent the greater part of his time inspecting vaccination in the various districts and checking vaccination returns. In spite of constant vigilance the results obtained were unsatisfactory, the percentage of successes gradually falling lower and lower. At first this loss of efficiency was laid at the door of the district vaccinators and the deputy inspectors of vaccination, who were harassed and fined until it was realised that perhaps the vaccine lymph might have something to do with the bad results. All lymph for the Presidency is manufactured at the King Institute at Guindy—some five miles out of Madras City—where the average temperature may be taken to be the same as in the city. The average temperature throughout the Presidency—which in this respect is unlike other parts of India—is never very low; it will be shown later how this militates against success. The position reached can be understood from the following communiqué issued by the Madras Publicity Bureau:—

"The results of vaccination in this Presidency have not been satisfactory for some years, though other provinces have continued to show good results. In order to discover the causes of this deterioration, the Government deputed Major J. Cunningham, I.M.S., and later Rao Bahadur M. Kesava Pai, M.D., of the King Institute, to visit the lymph depôts in other provinces and report on the methods of lymph production and preservation in these depôts. The investigations of these officers indicate that climatic conditions in this Presidency are unfavourable to the success of vaccination in the hot weather. The experience of other provinces also points to the same conclusions. In the Punjab and in the United Provinces routine vaccination operations on the plains cease during the hot weather, and are resumed as soon as the weather becomes cool. Fresh vaccine lymph has been found to be more effective than lymph issued some time after manufacture, but in practice it has been found impossible to manufacture lymph at the King Institute during the hot months, with the result that fresh vaccine can only be issued from the Institute if vaccination is confined to the cooler months. The small-pox returns of the last ten years also indicate that the disease is most common between January and May, and that if vaccination were restricted to the cooler months, it would anticipate the period of greatest mortality which would be of considerable advantage.

"Having regard to all these considerations, the Surgeon-General has strongly recommended a total cessation of routine vaccination work in the plains during the hot season except in cases of emergency, such as the presence of small-pox in an epidemic form. The Government approve the Surgeon-General's proposal. They accordingly direct that the supply of vaccine lymph from the King Institute shall cease during the months of May and June. The Government trust that it will be possible for the local bodies to employ the vaccination staffs usefully in other ways, such as checking records and registration of births and deaths during the two months when vaccine operations are suspended."

A further investigation into the average temperature showed that the south-west monsoon had no effect on many parts of the Presidency, and accordingly the Government have also agreed to the suspension of vaccine operations during July and August in such areas. This will give the King Institute a better chance of providing fresh vaccine lymph during the cooler months. Another important problem which has not yet reached a satisfactory solution is the method of transporting the lymph. At present it is packed up in small cardboard boxes and is distributed through the post. In many instances the lymph takes three days to reach its destination, and the high temperatures to which it is exposed cause a rapid deterioration in its potency. Various suggestions have been made, none of them very satisfactory, but it is obvious that until the lymph is packed in such a manner that it is maintained at a moderate temperature, it will never give a very high success rate.

The Sanitary Department in Madras.

As recently as 1914 the Sanitary Department consisted of the Sanitary Commissioner and one deputy for a population of 46 millions. In 1918 two more Deputy Sanitary Commissioners (D.S.C.'s) were appointed, and the Presidency was divided into three ranges, one D.S.C. for each. In 1920 a fourth appointment was made in order to permit of the senior D.S.C. being placed on special duty for the sanitary control of fairs and festivals. There are hundreds of sacred temples and shrines in the Presidency, all of which at one time or another attract considerable numbers of pilgrims, whilst some festivals are attended by many thousands of people. Here, obviously, was one of the most important means of spreading cholera, and it was felt that part of the danger might be averted. During the present month, for instance, the Pushkaram festival at Bezwada, which takes place only once every 12 years, and which lasts 10 days, will, it is anticipated, be attended by something like 1½ millions of people. For a town whose normal population is about 55,000, and from which run several large canals fed by the River Kistna, this enormous addition to the population constitutes a tremendous danger. Arrangements for sanitary control, for medical inspection of the pilgrims, for provision of additional water-supply and food, for temporary housing, hospitals, &c., have been in progress for the past six months or more under the guidance of the senior Deputy Sanitary Commissioner. Experience has already shown that this form of preventive work can be made very successful, for during another large festival, held in May of this year, not a single case of cholera occurred. Such extraordinary success may not always be possible, but it nevertheless demonstrates what can be accomplished by forethought and organisation.

The Secretary of State has recently sanctioned two more D.S.C.'s—i.e., six in all—a remarkable increase in the short space of seven years; but it is not to be supposed that the number is excessive. The work which lies waiting to be done could absorb the energies of twice six, and it is somewhat difficult to decide what problems most urgently require attention. The local Government has decided that in future D.S.C.'s shall be recruited from the provincialised Health Officer Service, so that it will now be possible for a Madras graduate to rise to the post of Sanitary Commissioner, the head of the Sanitary Department. It is believed and hoped that with this extension of activity the terms "Sanitary Commissioner" and "Deputy Sanitary Commissioner" will be replaced by the more correct and significant titles of "Director of Public Health" and "Assistant Director of Public Health."

Public Health Services.

REDUCTION OF THE CAPITATION FEE.

ACCORDING to the lay press there is to be a raid on the capitation fee payable to medical men working under the National Insurance Act. The capitation figure was fixed at 11*s.* on March 5th, 1920, by an arbitration between the Insurance Acts Committee of the British Medical Association and the Ministry of Health, the fee being considered to "afford fair remuneration for the time and services" given by practitioners under the regulations for medical benefit. The Minister of Health stated in the House of Commons at the time that the award had been received on both sides with the utmost goodwill. It was then understood that there was no finality about the capitation basis and that after the year 1920 notice of not less than three months might be given to vary the terms and conditions of service, to alter the basis of remuneration, or to repudiate service altogether by organised effort. Since that date panel practitioners have settled down to fulfil their share of the contract, leaving improvement in the remuneration to be considered at a more convenient season. The *Times* of Sept. 6th said that it was argued that the capitation fee might be brought down to 9*s.* 6*d.* without seriously interfering with the health of the country, no intimation being given by whom it was being argued. The *National Insurance Gazette* for Sept. 3rd states that there are proposals to cut down by 2*s.* 6*d.* the Treasury grant of 3*s.* 6*d.* paid to the doctors in respect of medical benefit; and again on Sept. 10th, that the Treasury is "determined in its course of action." The assumption apparently is that the Treasury grant was increased from 2*s.* 6*d.* to 3*s.* 6*d.* at the time the capitation fee was raised to 11*s.* As a matter of fact the new figure has never been split up into its constituent parts as the original capitation fee was. If the 11*s.* fee was granted on the ground of increased cost of living there may be a case for reduction if and when the medical man's cost of living is reduced. On the other hand, the increased responsibilities, the improvement in the nature of the services, and the keeping of records, are all grounds for maintaining the fee at its present level.

ANNUAL REPORTS OF MEDICAL OFFICERS OF HEALTH.

Nuneaton.

IN his report for 1920 Dr. A. Middleton Hewat tells us that a new infant welfare centre has been opened during the year; that the enlargement of the fever hospital so as to admit diphtheria has been postponed, although the case fatality of diphtheria during the last eight years has been 20 per cent.; that a Bill is now before Parliament to secure an additional water-supply through the Leicester Corporation; and that steps are being taken to improve the overworked sewage works and the affluent therefrom. He describes Nuneaton as essentially a working-class town. Of the 8373 houses, 5102 have been built since 1891. A very large proportion of the working-class houses possess gardens, and the number of allotments under cultivation in the borough, exclusive of railway allotments, is 2929, with an acreage of 291. With an adult male population of about 13,000, this means a large proportion engaged in healthy outdoor occupation. Good health statistics may therefore be anticipated.

The estimated population for 1920 was 41,128; the birth-rate was 29·5 in 1920 and 22·7 in 1919; the death-rate was 9·6 in 1920 and 10·9 in 1919; the infant mortality rate is not so good—viz., 83, in comparison with 80 for the 148 smaller towns. The diarrhœa rate was 7·6 per 1000 births, as compared with 7·8 for the 148 towns. The tuberculosis death-rate was 0·62 for pulmonary and 0·26 for other forms. Dr. Hewat thinks this cannot be looked upon as excessive under present conditions in an industrial town where a large proportion of the population is engaged in coal-mining. But low phthisis rates are the rule among men in coal-fields, and coal-mining districts are practically the only parts of England where the female phthisis rate is equal to or exceeds the male.

Nuneaton has still privies to convert and privy-midden tips to abolish. Dr. Hewat comments on the uncleanliness of the milk-supply, in which respect Nuneaton is like the rest of the country. Dr. A. A. Wood, the M.O. for infant welfare, mentions that the system of having "one delivery" in the day instead of two means that the milk is often 36 hours old when used, and this has counterbalanced any little improvement that may have been secured by greater cleanliness. Dr. Wood comments on the almost complete disappearance of the atrophied infant, and says that rickets has become uncommon in spite of the wide use of dried milks, particularly during 1917, 1918, and 1919. Only about 6 per cent. of the children are vaccinated. Dr. Hewat reports the usual overcrowding, shortage of houses, long waiting list for corporation houses, and difficulty in getting repairs done.

Spenborough.

The urban district of Spenborough came into existence in 1915 by the amalgamation of Cleckheaton, Liversedge, and Gomersal, and includes a portion of the Yorkshire coal-field lying to the west of a line joining Bradford and Dewsbury. The trades of the district show great variety. The estimated population for 1920 was 31,241; the birth-rate, only 16·4 for the preceding five years, rose to 20·1 in 1920, a figure still low for an industrial district. The death-rate was 12·3, and included 19 deaths from influenza. The infant mortality rate was 82·8, slightly above the rate for the whole country, and of the 52 infant deaths no less than 33 occurred in the first four weeks. The diarrhœa rate under 2 years of age was low, only 1·6 per 1000 births, as compared with 7·8 in the 148 smaller towns. This no doubt, Dr. Lawrence Pick says, was largely due to the exceptionally cold and wet summer. The tuberculosis rate was 1·0. Five cases of ophthalmia neonatorum were notified, but no mention is made of permanent damage to eyes.

In regard to housing, Dr. Pick says there can be few districts more urgently in need of new houses; 12 per cent. more houses are required, and a large number should be condemned. There are many back-to-back houses, and owners are obviously unwilling to spend a sum of money on repairs equal to five or six years' rent or more. Much delay has taken place in the housing scheme. The first tender for the A1 non-parlour type was £1291 4*s.* 5*d.* After much conferring the figure became £909 towards the end of the year. Good progress is now being made with 50 houses. Two health visitors were appointed in July, in addition to one appointed in 1916, but no centre has yet been opened. The three health visitors also act as school nurses.

Heston and Isleworth.

A pleasing feature in Dr. W. A. Berry's report is the evidence of coördination of health services. Thus one committee performs the duties of the Health Committee, the Medical Inspection Sub-committee of the Education Committee, and the Maternity and Child Welfare Committee. The area is divided into five districts, and one "health nurse" acts as school nurse and health visitor for each district. Dr. Berry is school medical officer. His assistant, Dr. Eva Roberts, whose duties are mainly in connexion with school children, has charge of one child welfare clinic, in which antenatal work is dealt with. As in other urban districts, the local authority is not the supervising authority of the midwives. The medical officer of health does not therefore receive notification of "inflammation of the eyes,

however slight," in accordance with the rules of the C.M.B. He receives later the notification of the case as "ophthalmia neonatorum" if the medical man called in considers it to be such, but the method may cause dangerous delay. Dr. Berry instances cases of inflammation of the eyes discovered by the health visitors, with regard to which complaint was made to the county supervising authority that the midwife had failed to observe the rules. Eight cases of ophthalmia were notified. Three were nursed in an institution, and of these one was discharged blind in both eyes. It will naturally be asked whether there was delay in getting adequate treatment for this case.

The population of Heston and Isleworth for 1920 was 43,445 for birth-rate and 41,945 for death-rate; the birth-rate was 24·7; the death-rate was 10·9; the infant mortality rate was 58. There appears to be an unusual demand for antenatal advice and a prospect of a flourishing antenatal clinic. A home-help was appointed in 1919, and her services have proved very useful. During the year she paid 328 visits to homes for the purpose of rendering assistance. The school report shows that treatment of the defects found is being provided in a systematic manner, but that in a considerable proportion of cases the services of the school dentist were refused. Dr. Berry mentions that there are no facilities for open-air education, and that there is, as yet, no organiser of physical training for the elementary schools in the district.

SCHOOL MEDICAL SERVICE.

Liverpool.

IN Liverpool the close coöperation between the public health and allied services is agreeably noteworthy. Nearly 50,000 children are dealt with annually at the routine examinations, at which last year about 45 per cent. showed some defect. Tonsils and adenoids requiring treatment accounted for 3·1 per cent., while 6·4 per cent. were kept under observation—"the very gross cases are now, fortunately, very seldom met with." Only seven definite and 30 doubtful cases of pulmonary tuberculosis were found during these examinations, and Dr. E. W. Hope reports that at the end of the year the total number of such cases under observation was 438, all of which had been excluded from school. Besides these, there were 365 cases of non-pulmonary tuberculosis, 81 of which attended the public elementary and 108 the physically defective schools. Four open-air residential schools, with 376 beds between them, are available for these children. There appears to be no open-air day school.

On the list of nurses three women are returned as dental helpers; we look forward to many more of these before long. The sound principle is followed of treating school children and children of pre-school age in the same building. In tabulating the results of cleansing "in conformity with the Board's instruction, boys and girls are not differentiated," which, of course, makes the results numerically valueless, the figures depending on the distribution of boys and girls rather than on cleanliness and uncleanliness. A difficulty in accounting for the increase in ringworm cases seems to have been felt, but years ago it was pointed out that this disease ebbs and flows like one of the zymotics. Scabies here, as elsewhere, still remains a legacy of the war, the number of absentees during the year from this cause being the highest on record. The average attendance at Liverpool's six clinics of 122 on school days dwindles to eight on Saturdays, which shows Saturday working to be hardly worth while. During the year 377 new and 1576 old cases of defective vision were seen at the clinics, while 2376 new cases were treated by the nine private doctors who undertake the work at a fee of 7*s.* 6*d.* per head. An inquiry extending over several months elicited the fact that out of 3636 children, 36 per cent. were not wearing their glasses. In 11 per cent. of the cases the glasses had been broken or lost; as to the remainder, the glasses had either been forgotten or, as is more probable, the children did not like wearing them. Here, as everywhere else, it is most difficult to get a hypermetropic child to wear glasses. Experience has shown in Liverpool that the amblyopic eye remains amblyopic in spite of all remedial measures tried. Nothing useful can be done in such cases, and from the public health point of view it is not worth while making the attempt. Two sight-saving classes deal with 18 per cent. of cases requiring such special educational treatment. Additional classes have been authorised, and it is hoped that they will soon materialise. Children attending voluntary schools are precluded from attending these classes, however serious their eye condition may be, without special permission of the committee, on the written application of the parent.

The extensive survey of cripples sets out full statistics of 1770 cases between 5 and 14 years of age, but does not bring out clearly the epidemic of poliomyelitis, which appears to have occurred in Liverpool between 1912 and 1913. Approximately 40 per cent. of the tuberculous cases, 90 per cent. of paralyses, and 92 per cent. of rickets occurred before the age of 5; yet this city has no nursery schools. The Board of Education tables end an interesting and well-considered report.

Isle of Wight.

The number of children who underwent routine examination amounted to 2748. Of these 18 suffered from malnutrition, 677 from dental defect, 145 from defective vision, 27 from defective speech, and 1 from anæmia. There were three cases of definite pulmonary tuberculosis and one suspected case. Out of 1335 children referred for treatment, 547 obtained it. 401 cases of uncleanliness are reported, and in one case the parents were prosecuted and fined for non-attendance, but under the system adopted in the island of making the doctor pay his own travelling expenses it happens that he is fined more frequently than are the defaulting parents.

Ryde.

The total number of children submitted to routine medical inspection was 478. Of these 4 suffered from malnutrition, 124 from dental defect, 4 from defective hearing, 33 from visual defect, and 2 from defective speech. There were no cases of anæmia, nor of tuberculosis, although in one case pulmonary tuberculosis was suspected. 227 children were referred for treatment, and in just under one-half of these cases treatment was obtained. The school nurse paid 95 visits to each school in the borough, and examined each pupil four times during the year. 205 of these children suffered from uncleanliness, and there are no arrangements for cleansing. Dr. J. P. Walker notes that in nine out of ten cases where parents objected to examination, a medical inspection was found to be urgently needed.

Margate.

Of 1117 children submitted to routine examination, 63 required treatment for dental defect and 115 were kept under observation; 14 required treatment for enlarged tonsils and adenoids, 14 for defective hearing, 4 for otitis media, and 5 for defective speech. 153 children obtained treatment for defects of nose and throat under the local authority's scheme, and out of 1256 referred for dental defects throughout the year 1016 were treated. As a result of X ray treatment of ringworm, the period of absence was reduced from 24 weeks to between four and five. Dr. R. McCombe, in reporting on the employment of children out of school hours, records that 42 children were illegally employed, and that several errand boys were working out of school hours between 30 and 40 hours a week. Eleven out of the 42 children showed two to three years retardation in school work. About 20 girls were examined, but Dr. McCombe reports "as their work consisted chiefly of taking out babies and acting as 'mother's help,' I was of opinion that their employment was more conducive to health than otherwise."

Stockport.

Of 5668 elementary school children submitted to routine medical examination 33·85 per cent. were found defective. 8·7 per cent. were found suffering from enlarged tonsils and adenoids, and two-thirds of this number were referred for operative treatment. 12·94 per cent. had defective vision, 1·55 per cent. had otorrhœa, and, in addition, 2·82 per cent. suffered from deafness—"largely the result of untreated tonsils and adenoids." During the year treatment was received by just over half the number requiring it. The addition of a school dentist to the medical staff has been a step forward. There are no nursery schools. A scheme for effective supervision of physical education and for inaugurating the treatment of remedial defects has been approved by the authority. Seventy-five children per meal attended the feeding centres, as against 37 during the previous year. These children are weighed once a fortnight.

THE R. W. MICHELL MEMORIAL.

IT has been suggested by many of his old friends that some form of permanent memorial should be instituted at Cambridge in memory of the late Dr. R. W. Michell, who lost his life in July, 1916, as a result of wounds received whilst rescuing wounded on the Somme. After holding a demonstratorship in anatomy in the University, Michell remained in Cambridge, where his practice was chiefly among the undergraduates and younger graduates. His keenness and energy, his enthusiasm for the young life of the University, his desire to give the best of his experience to those who needed it among active undergraduates, endeared him to successive generations. Heart strain was one of the conditions he particularly laboured to understand, so that he might guide aright the natural bent of the sporting man. He was one of the first practitioners to make use of the electro-cardiograph as a regular routine in his clinical practice. As at one time he captained the College boat at Caius, and continued to take an unselfish interest in Cambridge rowing, it is proposed that the memorial should take the form of a challenge cup, to be awarded every year to the successful College Boat Club in the Lent and May races, and in various annual rowing and sculling events. Subscriptions, limited to £2 2*s*., may be sent to Dr. C. H. S. Taylor, 3, Trinity-street, Cambridge.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Lieut. A. C. Anderson to be Surg. Lieut.-Comdr.

The following appointments have been made:—Surg. Comdrs.—P. M. Rivaz to R.N. Hospl., Chatham; G. A. S. Hamilton to *Vivid* for Youths' Training Establishment; W. P. Walker to *Victory* for R.N. Barracks (temp.); W. H. Edgar to *Wildfire* for Sheerness Yard and Barracks: F. H. Hall to *Renown*; R. R. Horley to *Pembroke*, addl., for R.N. Barracks (temp.); and S. F. Dudley to *President*, addl., for Greenwich College, and as Prof. of Clinical Pathology.

Surg. Lieut.-Comdrs.—P. B. Wallis to *Colleen*, addl., for Haulbowline Hospl. and Yard; J. Kirker to *Wildfire*, and for Sheerness Yard; E. MacEwan to *Titania*; C. H. M. Gimlette to *Ambrose*; and A. Fairley to *Cordelia*; R. J. G. Parnell, A. G. V. French, M. C. Mason, S. W. Grimwade, A. B. Clark, and M. J. Aitken to *President*, addl., for five months' course of instruction to join R.N. College, Greenwich.

ROYAL ARMY MEDICAL CORPS.

The King has approved of the following appointments:—To be Colonels Commandant: Lieut.-Gen. Sir A. Keogh, Hon. Col. R.A.M.C., T.F.; Lieut.-Gen. Sir A. T. Sloggett; Maj.-Gen. Sir T. J. Gallwey; Surg.-Gen. Sir F. W. Trevor.

Lieut.-Cols. A. W. Hooper (granted the rank of Col.) and B. W. Longhurst retire on ret. pay.

Lieut.-Col. D. Lawson is placed on ret. pay.

Maj. W. R. O'Farrell to be temp. Lieut.-Col. whilst spec. empld. as A.D. of P.

Capt. D. T. M. Large to be temp. Maj. whilst spec. empld. as D.A.D. of P.

Capt. W. H. Dye is secd. for service under the Colonial Office.

Temp. Capts. relinquish their commns.: F. K. Kerr (granted the rank of Lieut.-Col.), E. Lauzon and W. S. Angus (retain the rank of Capt.).

ARMY DENTAL CORPS.

Flight Lieut. G. F. Charles, from R.A.F., Dental Branch, to be Capt.

Temp. Lieuts. G. Hepburn and A. R. B. Littlar relinquish their commns. on ceasing to be employed as dental surgeons and retain the rank of Lieut.

TERRITORIAL FORCE.

Maj. A. Bird, having attained the age limit, is retired and retains the rank of Major, with permission to wear the prescribed uniform.

Maj. H. H. B. Cunningham to be D.A.D.M.S., 53rd (Welsh) Divn.

Capts. E. F. Skinner and T. M. Jamieson to be Majs.

Maj. A. J. Gibson (late R.A.M.C., Spec. Res.), to be Capt., and relinquishes the rank of Maj.

Capt. J. L. Lawry (late R.A.M.C.) to be Capt.

Capt. S. McNaughton (late R.A.M.C.) to be Lieut., and relinquishes the rank of Capt.

Lieut. D. C. Graham to be Capt.

2nd Lieut. A. Pain (late Tank Corps) to be Lieut.

A. S. Pern to be Lieut.

1st W. Gen. Hosp.—Capt. W. Permewan, having attained the age limit, is retired, and retains the rank of Capt.

TERRITORIAL FORCE RESERVE.

Col. J. A. Jones, having attained the age limit, is retired, and retains the rank of Col., with permission to wear the prescribed uniform.

INDIA AND THE INDIAN MEDICAL SERVICE.

Maj. F. T. Thompson to be Lieut.-Col.

Major (retd.) to be Lieut.-Colonel (retd.): M. Dick.

The King has approved the retirement of Lieut.-Col. H. J. Walton.

The King has approved the relinquishment of their temp. commns. by the undermentioned, and the grant of rank as specified below: Capt. Sham Lal, Capt. Jatindra Mohan Mitra, in consequence of ill-health. And are permitted to retain the rank of Capt.: Harmusji Framji Maneckshaw, Dattatraya Mahadeo Bhatavadekar.

DONATIONS AND BEQUESTS.—The committee of the Christie (Cancer) Hospital, Manchester, has received the following bequests: Miss M. E. Adshead £567, Miss Sophia Benger £500, Mr. William Sutcliffe £200, Miss Emily Scown £100.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC.—A syllabus of post-graduate work for the term October–December has now been issued. Three courses will be given at the Hospital: 1. A course of clinical lectures and demonstrations will comprise attendance at out-patient clinics at 2 P.M., on Mondays, Tuesdays, Thursdays, and Fridays, followed at 3.30 P.M. by lectures delivered by Dr. Hinds Howell, Dr. F. M. R. Walshe, Dr. Grainger Stewart, Dr. Risien Russell, Dr. Farquhar Buzzard, Dr. Gordon Holmes, Dr. J. Collier, Mr. S. Scott, Dr. Russell Reynolds, Mr. D. J. Armour, Dr. S. A. Kinnier Wilson, Mr. P. W. G. Sargent, Dr. P. W. Saunders, Dr. James Taylor, and Mr. L. Paton. Provided sufficient entries are received, two additional courses will be given. Dr. Greenfield will give a course of 10 lectures and demonstrations, at 12 noon, on Mondays, commencing Oct. 3rd, on the Pathology of Nervous System, and a course of 10 lectures will be given on the Anatomy and Physiology of the Nervous System by Dr. Gordon Holmes and Dr. Hinds Howell, at 12 noon, on Fridays, commencing Oct. 7th. A fee of £8 8*s*. will be charged for the clinical lectures and demonstrations, and those taking this course will be entitled to attend the course in pathology without further payment. The fee for the pathological course alone or for the course in Anatomy and Physiology alone is £5 5*s*. Holders of the Fellowship of Medicines ticket for the National Hospital will be admitted to the clinical lectures and demonstrations and to the course in pathology.

Further information can be obtained from Dr. C. M. Hinds Howell, Dean of Medical School, Queen-square, Bloomsbury, London, W.C. 1.

Correspondence.

"Audi alteram partem."

MAN'S EVOLUTION FROM THE ANTHROPOID.

To the Editor of THE LANCET.

SIR,—I feel I must be only one among many of your readers who have found of exceptional interest Prof. L. Bolk's lecture on the Part Played by the Endocrine Glands in the Evolution of Man, which appears in your current issue. That the structural changes attendant upon animal evolution are in large measure brought about through the instrumentality of the endocrine system none can doubt. This system, as the professor observes, controls both ontogenesis and phylogenesis. Many human characteristics, such as orthognathy and hairlessness, he attributes to a suppression, brought about by the endocrine system, of anthropoid characters; and he further suggests that the retardation in the developmental rate of man, a condition essential to his high grade of evolution, may be due to the change in "the nature of his food, the frugivorous ancestor of man becoming omnivorous or carnivorous."

This latter surmise—as to the truth of which I am not prepared to offer an opinion—I find of peculiar interest, inasmuch as it accords with a view already put forward by me in this journal[1]—namely, that man's evolution from the anthropoid was determined by the search for animal food—the abandonment of the forest for a hunting career. I argued that the evolution of *homo sapiens* depended upon the difference in point of difficulty between plucking a sessile fruit and catching an elusive prey. Herein lies the key to the situation. I may, perhaps, be permitted to quote from the second of the two papers referred to.

"It was the conditions entailed by a hunting career which brought about the evolution of the pre-human ape into man. For observe the peculiar situation—assuredly one of the most eventful and dramatic in the whole of man's evolution—when this creature took to hunting. Here was a being lacking the stereotyped equipment for slaughter, instructive and anatomical, of the carnivora, but gifted with an intelligence surpassing that of any other creature, and endowed with prehensile hands capable of giving effect to that intelligence. It was a situation in which intelligence counted in the life-struggle as it had never counted before, and it inevitably led to the evolution of a higher type. This agile, intelligent, hand-endowed precursor of man was compelled to rely upon his intelligence in hunting his prey—to live by his wits: for blind instinct he had to substitute strategy; for natural weapons, weapons made by hand. Once the pre-human ape started on his career of hunter, he began a struggle in which it was inevitable that a higher and ever higher grade of intelligence should continue to evolve by natural selection until sufficient mental capacity had been attained to render its possessor supreme in the chase."

It is obvious that something must have happened in the case of the pre-human anthropoid, alone of all the anthropoids, which greatly increased the survival-value of intelligence. That something was the adoption of a hunting career by a highly intelligent prehensile mammal lacking the special hunting equipment of the carnivora.

It is conceivable that the adoption of a highly animalised diet may have facilitated man's evolution from the anthropoid in the manner suggested by Prof. Bolk; but that the initiation and maintenance of that evolution were due to the conditions necessitated by the procuring of animal food rather than to the effect of animal food upon the organism may, I think, be regarded as certain.

I am, Sir, yours faithfully,

Wimpole-street, W., Sept. 11th, 1921. HARRY CAMPBELL.

[1] Man's Evolution, Past and Present, THE LANCET, 1913, i., 1260, 1333, 1408, 1473. The Biological Aspects of Warfare, THE LANCET, 1917, ii., 433, 469, 505.

THE SWIMMING-BATH AND CATARRHAL OTITIS.

To the Editor of THE LANCET.

SIR,—In the annotation upon the above in your issue of Sept. 3rd, you state that Dr. K. Amersbach seems to have been discouraged from making any bacteriological examination by the fact that investigations of the kind undertaken by ophthalmologists on swimming-bath conjunctivitis had been inconclusive; and in his letter of Sept. 10th Dr. Dan McKenzie also deals with ear infection, stating that every effort should be made to render and to keep swimming-bath water as clear as possible. I should like to remind you that in September, 1909, in two somewhat lengthy reports, and in my annual report for the year 1909, I pointed out to the Baths and Washhouses Committee of the Poplar Borough Council the horrible dangers of the public swimming-baths, inter alia mentioning how quickly swimming-bath water changes its pristine sweetness even after being used only by a few bathers, particularly so in warm weather, and becomes after use by a number of bathers nothing more nor less than diluted sewage, and this condition exists often before the first day's use is finished. The formation of slime in the bath water was also mentioned and commented upon at length.

As it is during the months of July, August, and September that swimming-baths are mostly used, it would be of considerable interest if bacteriologists would take into consideration the possible connexion with disease of polluted swimming-bath water, more especially the slime which forms and settles at the bottom of the baths and becomes stirred up by the swimmers, and to find out if such slime plays any part in disease. I am sorry I cannot oblige with any of the slime from the Poplar swimming-baths, as they are kept free of it by the addition of electrolytic fluid manufactured by the Poplar Borough Council and added in the proportion of one part of chlorine to two million parts of the bath water. In swimming-baths a vegetable growth also occurs on the sides, but since the treating of the water in the Poplar baths such growth is absent.

I would also call Dr. McKenzie's attention to the "Report on Purification of the Water of Swimming Baths" by a Committee of the Royal Sanitary Institute, November, 1912 (excerpt from Vol. XXXIV., No. 1, 1913, of the *Journal of the Royal Sanitary Institute*).—I am, Sir, yours faithfully,

FREDK. WM. ALEXANDER,
Medical Officer of Health.

Bow-road, E., Sept. 10th, 1921.

THE NATURAL HISTORY OF ENCEPHALITIS LETHARGICA.

To the Editor of THE LANCET.

SIR,—Dr. H. Willoughby Gardner, in the important and interesting letter published in your columns this week, shows that, concerning the cases now called "encephalitis lethargica," he has arrived at certain conclusions which he shares with not a few physicians who, like him, have practised as consultants in wide and somewhat thinly populated country districts, and who have been able therefore to adopt the epidemiological point of view, or, in his own words, *to observe the natural history of diseases.*

Briefly, Dr. Gardner finds that the cases now referred to the fluctuating and arbitrary concept denoted by the term "encephalitis lethargica" should be considered as the nervous manifestations of a disease which is (1) very widespread, (2) markedly infectious, and (3) "new in character," whilst otherwise indicated by (*a*) fever, (*b*) sore-throat, (*c*) gastro-intestinal, and (*d*) bronchial catarrh, together with (*e*) an inconstant erythema, (*f*) marked prostration, and (*g*) slow recovery.

It was on precisely similar clinical and epidemiological observations that Fernel, Benedetto and others, in the sixteenth century, based their famous doctrines

concerning "catarrh," considering the nervous cases and epidemics of their time as alternative manifestations of the disease otherwise responsible for the cases and epidemics of respiratory and gastro-intestinal catarrh which make up for us so great a part of what we call influenza. It was on precisely similar clinical and epidemiological observations that Boström, in 1757, based his identification of the "new disease" at Upsala with the epidemic and catarrhal fever, of protean nature, to which the name of influenza was then being elsewhere attached. It was again on precisely similar grounds that Brorström, in 1910, founded his thesis of the relation between epidemic poliomyelitis and influenza.

There is, indeed, only one "disease" to which we can refer the picture so graphically outlined by Dr. Gardner and that is influenza—in the epidemiological if not the bacteriological sense. What we call epidemic influenza has been consistently described for some 500 years now, as always, "new in character." Yet, as Boström said. "Hic morbus non est novus."

I am, Sir, yours faithfully,

F. G. CROOKSHANK.

Wimpole-street, W., Sept. 10th, 1921.

THE COUGHING CUP IN THE PREVENTION OF TUBERCULOSIS.

To the Editor of THE LANCET.

SIR,—Tuberculosis is spread in only three ways—by milk, spray, and sputum. Milk should be boiled, and the sputum collected in a flask and destroyed. But the chief agent and danger is from the spray given off in the act of coughing. A cavity case sitting at his table, and spraying the food-supply of the family, is probably the most dangerous agent in spreading the disease.

I would therefore suggest the use of *a coughing cup*, in which the spray given off should be collected, and the cup and its contents be boiled each night. A coughing cup is of as much importance as a sputum flask, and all patients with T.B. in their sputum should use one. In a parallel way the central feeding stall in all cow byres should be abolished, as I feel sure it is one of the most dangerous arrangements for spreading tuberculosis amongst cattle—an infected animal coughing infected froth into the face and fodder of the opposite animal.

I am, Sir, yours faithfully,

T. M. ALLISON, M.D.

Jesmond-road, Newcastle-upon-Tyne, Sept. 8th, 1921.

THE TREATMENT OF PNEUMONIA.

To the Editor of THE LANCET.

SIR,—During the last four years I have treated acute pneumonic fever, so-called pneumonia, in the following way. In my list, 255 patients were seen reasonably early; among these there was not a single death, no complications, and no case which caused me anxiety. Only amongst those coming under treatment late in the disease, when heavily toxic, did I find cause for anxiety or had deaths. The majority of my cases were Europeans, the rest were Asiatics with a few natives. Many of these were in the influenza epidemic of 1918 and were particularly malignant. Pneumonia here is certainly of as severe a type as in Europe.

The principles of treatment were: 1. Not to allow the temperature to rise above 101° F. 2. To reduce blood pressure. 3. To combat acidosis. 4. To keep the kidneys and bowels active. 5. Starvation. 6. No stimulants. 7. Thoroughness. No. 1 was carried out by having the body continuously naked and wet on a waterproof sheet, in a draught of air, varied in severity according to the mouth temperature at the time. No. 2 by bleeding (a pint or so according to the patient), by calomel, or by both. Bleeding was done very early, never late (when done early apparently only toxins are removed, when late antitoxins are also taken away). No. 3 by giving gallons of water to drink a day, by citrate of potash, bicarbonate of soda, lemon-squash and sugar. No. 4 by the above and by calomel in minute doses often. For the first 24 hours the patients were purged severely. For toxic cases, seen late, reliance was mostly placed on severe purgation immediately and the doing away with acidosis. No. 5 sugar was the only nourishment given until the fever was gone and until the patient became hungry. No. 7 treatment was not changed or modified for the wishes of the patient or of friends; it was directed to save life.

This skeleton of treatment is intended to elicit interest and trial by others. All other fevers, irrespective of the cause, have been treated on the same general principles with much the same results. These results have convinced me of the correctness of the Johns Hopkins principle, that antitoxins are not satisfactorily formed in the presence of a high temperature.

I am, Sir, yours faithfully,

R. W. BURKITT.

Nairobi, Kenya Colony, July 30th, 1921.

THE REFRACTORY IRIS.

To the Editor of THE LANCET.

SIR,—The interesting annotation on Refractory Iris in your issue of Sept. 10th seems to me to lead to a very important question. Mention is made in the paragraph just cited of the fact that in certain races there are no crypts in the iris. It would be very important to ascertain if these races are more subject to glaucoma than others. Perhaps some of your readers who have opportunities of gathering statistical data on the subject would do so, and thereby render an important service to ophthalmic science.

I am, Sir, yours faithfully,

Glasgow, Sept. 12th, 1921. FREELAND FERGUS.

VERONAL AGAINST SEA-SICKNESS.

To the Editor of THE LANCET.

SIR,—The Channel passage used for many years to be a misery for me, as I suffered acutely from sea-sickness and once for days after from so-called land-sickness. During the last eight or ten passages I have taken veronal and have never been sick, even though the majority of the passengers succumbed. I have a light meal before going on board and take 8 gr. of veronal or its sodium derivative, which, being soluble, acts faster. I pass the first hour, and if rough the whole passage, in the recumbent position on deck. Many patients have also derived benefit, some even during longer voyages, by taking 2–3 doses a day for a couple of days.

I am, Sir, yours faithfully,

Zurich, Sept. 9th, 1921. THEODOR ZANGGER, M.D.

Obituary.

THOMAS ARTHUR HELME, M.D., F.R.S. EDIN., M.R.C.P. LOND.,

CONSULTING PHYSICIAN, NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, MANCHESTER.

WE referred briefly in our last issue to the death of Dr. T. A. Helme, which occurred on Sept. 5th at Rhosneigr, Anglesey. Thomas Arthur Helme was the fifth son of Mr. James Helme, of Lancaster, and the brother of Sir Norval Helme, Dr. James Milner Helme, of Silverdale, and Dr. G. Edgar Helme, of Rusholme, with the two latter of whom he received his medical education at the University of Edinburgh at a time when Sir William Turner was professor of anatomy. Sir William Turner, himself a Lancaster man, took a great personal interest in his young fellow-townsmen. T. A. Helme had a distinguished career as a student; taking his M.B. and C.M. with honours in 1885, he gained the Buchanan Scholarship

for proficiency in midwifery and gynæcology. The Buchanan scholar is required to act for six months as resident physician in the university gynæcological wards of the Royal Infirmary, and this appointment was of great professional value to Helme, bringing with it also the formation of a lifelong friendship with his teacher, Sir Alexander Simpson. In 1886 he obtained the Leckie-Mactier Fellowship, and proceeded to Strasbourg, where he carried out researches in his own specialty, being awarded a gold medal for the thesis which he presented for his degree of M.D. in 1889. In 1890 he was elected Freeland Barbour Research Scholar

Dr. Helme began general practice in Fallowfield, Manchester, along with Mr. John Priestley, but found its pursuit not to his liking. On the advice of his friends he applied for and obtained the post of resident obstetric surgeon in St. Mary's Hospitals, an appointment usually held for three years, and one unrivalled in its opportunities of obtaining clinical experience in work of midwifery and gynæcology, being the nearest approach in this country to the much-coveted post of "interne" in the Paris hospitals. This meant severing his connexion with general practice, and a second spell of work as a resident physician in a hospital. The whole trend of Helme's work was towards midwifery and gynæcology, so that with his Edinburgh, Strasbourg, and Manchester experience in the theoretical, clinical, and practical aspects of these subjects he was well justified in becoming a consultant in Manchester at the end of his residentship. He was appointed shortly thereafter to the post of assistant gynæcologist to the Clinical (now the Northern) Hospital for Women and Children, and some years later, on the death of Dr. Samuel Buckley, he became honorary physician to that institution. Although never physically robust, and in spite of a measure of ill-health, Dr. Helme was soon well known as a specialist over all the North of England, where, as in Manchester and its neighbourhood, his services as a consultant were in constant request, so that during a busy professional life he rapidly acquired a large practice.

But his energies and activities were by no means confined to purely professional work. He did not write much, but what he wrote was of solid worth. Amongst publications were "Anatomy and Physiology of the Uterus, with Action of Drugs upon it" (Graduation Thesis, 1889), "Changes in Muscle Fibre, Connective Tissue and Blood-Vessels of Uterus during Pregnancy and Puerperium," "Aseptic and Antiseptic Methods in Midwifery," and "The Unborn Child: its Care and its Rights." For many years he was honorary secretary to the Manchester and Salford Sick Poor Nursing Institution, and was also vice-president of the North of England Obstetrical Society. He threw himself with great ardour into certain phases of medical politics, and was a useful member of the Council of the British Medical Association, while he acted as secretary and was for a period president of the Lancashire and Cheshire branch of the Association. His name came prominently before the public as a champion of certain medical interests, and he was a doughty opponent of the National Health Insurance Bill. The Edinburgh tradition of guarding the honour and dignity of his profession found expression in many phases of his professional activity. A friend of and sympathiser with the poor, his memory will be gratefully cherished in many homes in and around Manchester, where practically the whole of his professional life was spent.

LONDON TELEPHONE EXCHANGES.—Additional transfers from the Mayfair to the Langham Exchange, not mentioned in our last issue, are the following:—

Mayfair.	Subscriber.	Langham.
1313	Chaldecott, J. H.	1313
5959	Yearsley, Macleod	1487

and from the Mayfair to the Grosvenor Exchange:—

Mayfair.	Subscriber.	Grosvenor.
3677	Robinson, W. E.	1408

Medical News.

VISIT OF DR. OSKAR FRANKL TO DUBLIN.—On the invitation of the Royal Academy of Medicine in Ireland three lectures have been delivered in Dublin during the past ten days by Dr. Oskar Frankl, the distinguished head of the Schauta Clinic in Vienna. The subjects chosen by Dr. Frankl were "Menstruation and Ovulation," "The Early Diagnosis of Uterine Cancer," and "Radium and X Ray Treatment in Gynæcology." As a teacher of unusual lucidity with an almost unrivalled experience, his lectures attracted large audiences. In addition to his set lectures to the Royal Academy, Dr. Frankl conducted daily classes in Trinity College and at the Coombe Hospital, both of which were well attended. Our Irish Correspondent, in chronicling the visit, writes: One may hope that the precedent set by Dr. Frankl's visit will not be forgotten. The Royal Academy would increase its prestige and put the medical profession of Ireland still further in its debt if it were to arrange at intervals for such a visit from some distinguished foreign teacher. The welcome given to Dr. Frankl by the Dublin School means more than merely what is due to a distinguished man of science. It is a sign of admiration for the magnificent work for humanity and knowledge performed by the Vienna School in the past, and of sympathy with the vitality which that School still exhibits amid circumstances of almost overwhelming difficulty.

WESTMINSTER HOSPITAL MEDICAL SCHOOL.—The introductory address of the winter session will be given in the board room of the hospital on Friday, Sept. 30th, at 4 P.M., by Dr. Adolphe Abrahams, on "The Advantages and Disadvantages of a Small Medical School."

DORSET COUNTY HOSPITAL, DORCHESTER.—The new pathological department and X ray and electrical rooms will be open to inspection on Wednesday, Sept. 21st, at 3.30 P.M., when Mr. James Sherren, surgeon to the London Hospital, will give an address on "The Value of Pathological and X Ray Examinations in Abdominal Surgery."

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL DINNER. The annual dinner will take place at the Imperial Restaurant, entrance in Glasshouse-street, London, W., on Saturday, Oct. 1st, at 6.30 for 7 P.M. The chair will be taken by Dr. H. A. Des Vœux. Tickets may be obtained from the hon. secretaries, Dr. Claude Frankau and Mr. J. A. Torrens, at the hospital.

SOCIETY FOR THE STUDY OF INEBRIETY.—The Ninth Norman Kerr Memorial Lecture will be delivered by Sir Arthur Newsholme on Tuesday, Oct. 11th, at 5.30 P.M., in the Barnes Hall of the Royal Society of Medicine, 1, Wimpole-street, London, W. 1. The subject of the lecture is "Some International Aspects of Alcoholism with Special Reference to Prohibition in America."

SOCIETY OF M.O.H.'s.—The annual general meeting of the Navy, Army and R.A.F. Hygiene Group of the Society will be held at 1, Upper Montague-street, Russell-square, London, W.C. 1, on Friday, Sept. 30th, at 4.30 P.M., when Major-General Sir W. G. Macpherson will read a paper on "The Disposal of Latrine Contents, with Special Reference to Immediate Incineration." All members of the Society are invited to attend and take part in the discussion. Surg. Rear-Admiral Sir P. W. Bassett-Smith has been nominated to succeed Lieut.-Colonel H. R. Kenwood as President of the Group for the coming session.

CONFERENCE OF THE BRITISH COMMERCIAL GAS ASSOCIATION.—At the tenth annual conference of the Association to be held in the Royal Technical College, George-street, Glasgow, on Sept. 27th and 28th, the subjects to be discussed at the public sessions will be "Gas in Relation to Hygiene and Smoke Abatement" and "The Industrial Uses of Coal Gas." Dr. J. S. Owens, superintendent to the Advisory Committee on Atmospheric Pollution, will contribute to the former discussion a paper on "The Prevention of Smoke Pollution," and Dr. C. W. Saleeby will deliver a lecture on "Life and Light."

THE FARADAY SOCIETY.—A general discussion on Catalysis with Special Reference to Newer Theories of Chemical Action will be held at 4.30 P.M. on Wednesday, Sept. 28th, at the Institution of Electrical Engineers, Victoria Embankment, W.C. 2. Prof. J. Perrin (Paris) and Prof. Irving Langmuir will open the discussion, and among those contributing to it are Prof. E. C. C. Baly, Prof. F. G. Donnan, Prof. W. C. McC. Lewis, Prof. A. Lindemann, Prof. A. W. Porter, and Dr. E. K. Rideal. It is expected that Prof. Arrhenius and Prof. Victor Henri will also be present. Tickets of admission may be obtained from the Secretary of the Society, 10, Essex-street, London, W.C. 2.

POST-GRADUATE COURSE ON INFANT AND CHILD WELFARE.—A course of 12 lectures on the Management and Feeding of Infants and Young Children will be given by Dr. Eric Pritchard (physician in charge of the Infant Welfare Department) to qualified practitioners on Wednesdays and Fridays at 6 P.M., commencing Oct. 5th, at the St. Marylebone General Dispensary. Students taking this course will be entitled to attend the Infant Consultations held by Dr. Pritchard on Tuesdays at 11 A.M. and Thursdays at 3 P.M. at the Dispensary. Opportunities will also be afforded to students of visiting the Nursery Training School, 1, Wellgarth-road, Golders Green, on Saturday afternoons. Further information and tickets for the course (two guineas) may be obtained from the secretary, 77, Welbeck-street, Cavendish-square, London, W. 1.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL.—The opening ceremony of the winter session will be held at 3 P.M. on Friday, Sept. 30th, when the introductory address will be given by the Right Hon. Lord Gorell, C.B.E., M.C.

The annual dinner of past and present students will be held at 7 for 7.30 P.M. on the same day at the Café Royal, Regent-street, London, W., Mr. F. F. Burghard, C.B., senior surgeon of the Hospital, in the chair.

Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.

MONDAY, Sept. 19th.—2 P.M., Dr. S. Pinchin: Medical Out-patients. Dr. Simson: Diseases of Women. Mr. MacDonald: Surgical Out-patients.

TUESDAY.—10 A.M., Mr. Steadman: Dental Department. 2 P.M., Dr. Burrell: Medical Out-patients. Mr. T. Gray: Surgical Out-patients. 2.30 P.M., Mr. Addison: Visit to Surgical Wards.

WEDNESDAY.—10 A.M., Mr. MacDonald: Genito-Urinary Department. 2 P.M., Mr. Addison: Operations. Mr. Gibb: Eye Department. Mr. D. Armour: Visit to Surgical Wards.

THURSDAY.—2 P.M., Mr. D. Armour: Operations. Mr. MacDonald: Surgical Out-patients. Mr. B. Harman: Eye Department.

FRIDAY.—10 A.M., Mr. D. Buxton: Dental Department. 2.30 P.M., Dr. Pritchard: Visit to Medical Wards.

SATURDAY.—10 A.M., Dr. Burnford: Visit to Medical Wards. 2 P.M., Dr. Owen: Medical Out-patients. Mr. Sinclair: Surgical Out-patients.

Daily:—10 A.M., Visit of Post-Graduates to Wards. 2 P.M., In-patient, Out-patient Clinics and Operations.

Appointments.

BURNS, DAVID, M.A., D.Sc., Grieve Lecturer on Physiological Chemistry in the University of Glasgow, has been appointed Professor of Physiology in the University of Durham College of Medicine, Newcastle-upon-Tyne.

GRAHAME, M. C. R., M.B., Ch.B. Edin., Tuberculosis Officer and Deputy Medical Officer of Health to the Burnley Town Council.

GUNN, R. M. C., M.R.C.V.S., Lecturer in Veterinary Anatomy and Surgery in the University of Sydney.

LANDAU, J. V., M.B. Lond., M.R.C.S., Anæsthetist at Queen Mary's Hospital for the East End.

THOMSON, C. S., M.D. Glasg., D.P.H., Medical Officer of Health of Deptford.

WILLAN, R. J., M.S. Durh., F.R.C.S. Eng., Consulting Surgeon to the Hexham and District War Memorial Hospital, Hexham.

WILLIAMS, P. L. W., L.R.C.P. Lond., F.R.C.S. Edin., to be one of the Medical Referees under the Workmen's Compensation Act for County Court Circuit No. 59.

WILSON, WM., M.D. Vict. Manch., Aurist and Laryngologist to the Manchester Board of Guardians (Crumpsall and Withington Hospitals and Booth Hall Infirmary for Children).

Vacancies.

For further information refer to the advertisement columns.

Aberystwyth Infirmary and Cardiganshire General Hospital. Res. H.S. £200.

Ayr District Asylum.—Jun. Asst. P. £300.

Birmingham General Hospital.—Res. M.O. £155. H.S.'s. Each £125.

Bournemouth, Royal Victoria and West Hants Hospital, Poole-road Branch.—Res. M.O. £200.

Bridgwater Hospital.—H.S. £165.

Bristol Royal Hospital for Sick Children and Women.—H.S. H.P. Each £150.

Cancer Hospital, Fulham-road, London, S.W.—H.S. £150.

Canning Town Women's Settlement Hospital, Balaam-street, Plaistow.—Female Sen. Res. M.O. £150.

Cardiff, King Edward VII. Hospital.—H.S. £200.

Central London Ophthalmic Hospital, Judd-street, St. Pancras, W.C.—H.S. £100. Jun. H.S. £50.

Chelsea Hospital for Women, Arthur-street, S.W.—Hon. Dental Surg.

Clifton, York, North Riding Mental Hospital.—Sen. Asst. M.O. £400.

Croydon General Hospital.—Vacancy on Hon. Med. Staff.

Derby, Derbyshire Royal Infirmary.—Ophth. H.S. £200.

Dumfries and Galloway Royal Infirmary.—Female Res. H.S. and Res. Phys. Each £150.

Glasgow, Bellahouston Hospital.—Pathologist. £600.

Hospital for Epilepsy and Paralysis, Maida Vale, W.—Hon. Ophth. Surg.

Hospital for Women, Soho-square, W.—Pathologist and Registrar. £100.

Leeds Public Dispensary.—Sen. Res. M.O. £250.

Manchester Northern Hospital for Women and Children, Park-place, Cheetham Hill-road.—H.S. £200.

Newcastle-upon-Tyne, Wingrove Hospital.—Female Sec. Res. M.O. £250.

Norwich, Norfolk and Norwich Hospital.—H.S. £200.

Notts County Council.—Tuberc. Officer. £750.

Oxford, Radcliffe Infirmary and County Hospital.—H.P. £200.

Plymouth, South Devon and East Cornwall Hospital.—H.S. £200.

Powick, Worcester County and City Mental Hospital.—Sen. Asst. M.O. £500.

Prince of Wales's General Hospital, Tottenham, N.—H.P. H.S. Each £200. Jun. H.S. Jun. H.P. Each £120.

Queen Mary's Hospital for the East End, Stratford, E.—Cas. O. £150.

Queen's Hospital for Children, Hackney-road, Bethnal Green, E.—H.P.'s. £100.

Rotherham Hospital.—Jun. H.S. £150.

Royal Chest Hospital, City-road, E.C.—H.P. £120. Res. M.O. £200.

Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—H.S. £100.

St. Helens Hospital, Lancs.—Res. M.O. £250.

St. Mary's Hospital Medical School, Paddington, W.—First, Second, and Third Assts. in the Med. Clinic. £750, £450, and £350 respectively.

Saint Pancras Dispensary, 39, Oakley-square, N.W.—Hon. Phys.

Salford Royal Hospital.—Res. Surg. O. £250. H.P. £200. H.S. £150. Cas. H.S. £150.

Salisbury General Infirmary.—H.S. £200.

Sheffield Royal Infirmary.—H.S. H.S. for Ear, Nose and Throat. Each £150. Asst. Cas. O. £150.

South Shields, Ingham Infirmary and South Shields and Westoe Dispensary.—Jun. H.S. £175.

Stoke-on-Trent, North Staffordshire Infirmary, Hartshill.—H.S. £200.

Sunderland Royal Infirmary.—H.S. £200.

Tunbridge Wells General Hospital.—H.S. £160.

Wakefield, Clayton Hospital.—H.S. £225.

West London Hospital, Hammersmith-road, W.—Two H.S.'s. H.P. Each £100. Surgeon.

Winchester, Royal Hampshire County Hospital.—Sen. Res. M.O. £250.

Wolverhampton County Borough Education Committee.—Asst. Sch. M.O. £600.

Wrexham Infirmary.—H.S. £200.

Births, Marriages, and Deaths.

BIRTHS.

HARRIS.—On Sept. 9th, at Holme, Sidmouth, the wife of Leslie Price Harris, M.C., M.R.C.S., of Gerrards Cross and Harley-street, of a daughter.

WEBB-JOHNSON.—On Sept. 5th, at East Sheen, the wife of Dr. Cecil Webb-Johnson, of a daughter.

MARRIAGES.

PENDERED—SINGER.—On Sept. 6th, at St. Peter's, Bedford, Captain J. H. Pendered, M.C., F.R.C.S., R.A.M.C., to Margaret Louise Singer, late Q.A.I.M.N.S., third daughter of Lieut.-Colonel G. H. and Mrs. Singer, of St. Augustine-road, Bedford.

THOMPSON—SEATON.—On Sept. 7th, at St. Michael's, Orchard Portman, Taunton, James Thompson, M.C., M.B., Ch.B., to Margaret Catherine, only daughter of the late Gervase Douglas Seaton and Mrs. Seaton, of Elmfield, Taunton.

VERNEY—SCOTT REID.—At Holy Trinity Church, Karachi, on July 28th, 1921, Major Leonard Morris Verney, D.S.O., F.R.C.V.S., Royal Army Veterinary Corps, only son of Richard John Verney, of Oxford, to Sydney Jessie Scott Reid, M.R.C.S., L.R.C.P. Eng., elder daughter of the late Surgeon-General Sir Adam Scott Reid, K.C.B., Indian Medical Service.

DEATHS.

CALLENDER.—On Sept. 5th, at St. Mary's Hospital, Paddington, after a short illness, Dr. Leonard Hay Callender, aged 50 years.

FREYER.—On Sept. 9th, at Harley-street, W., Colonel Sir Peter Johnston Freyer, K.C.B., late I.M.S., aged 69 years.

TROTTER.—On Sept. 10th, at a Leeds nursing home, Robert Hale Trotter, M.D., in his forty-ninth year.

WILSON.—At 36, Greenfield-road, Colwyn Bay, on the 11th inst., George Wilson, M.D., LL.D., in his 84th year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

THE HOSPITAL PROBLEM AND A NEW HOSPITAL SERVICE.

BY JOSEPH GRIFFITHS, C.M.G., M.CH. CAMB., F.R.C.S. ENG.,
SURGEON TO ADDENBROOKE'S HOSPITAL, CAMBRIDGE.

IT must be clearly understood that every attempt to place hospitals for the sick and injured on the rates under the Poor-laws has failed, and a new attempt is no more likely to succeed to-day than those made in the last century, even if the authority be changed to the County Council. Hospitals of large size, and more of them, are the greatest social need of the day; as the hospitals constitute the hub of the medical world, it is best to re-establish them on a sound and satisfactory basis so as to be able to build up and add spokes and a rim that will make a solid, substantial, and complete wheel of medical organisation with the general practitioner at every point in the periphery and the highly-trained specialist in the centre—each doctor a specialist in his own sphere, with every facility to pass the patients back and fore as conditions dictate, the whole being arranged and connected for the sole benefit of the sick and injured.

From small beginnings the hospital service in this country has gradually become very complex, and few are familiar with its many phases or understand how it is made up. It was created by charity, and not until 1840 was much done to relieve charity of a burden that had then become too heavy; in that year were passed the Poor Law Amendment Acts of Queen Victoria. Since that date the guardians have made provision—adequate in places, inadequate in others—for the care of the sick and indigent poor. In 1848 the first Public Health Act made provision under the Local Government Board for the isolation and treatment of infectious diseases, and thus to some extent relieved the charity hospitals. To-day we have charity hospitals, Poor-law infirmaries, public infectious diseases hospitals, &c.; the first governed by supporters of charity, the last two by public authorities, the guardians and the local public health body respectively. The provision made by the Poor Law Amendment Act and by the Public Health Acts far exceeds that supplied by charity.

The charity hospitals are divisible into two large groups—those with medical schools, and those without medical schools.

The Charity Hospital Medical Schools.

In this country medical education, begun in charity institutions, has been maintained in them by the help of generous friends—not from the funds of the charity—and by the great efforts and self-sacrifice of the medical teachers for centuries past. During the nineteenth century the Government gave help in some directions, and the Education Department is to-day experimenting with medical education in the hope of placing it on sounder footing, but there is doubt whether the experiment will serve its intended purpose. The hospitals in which medical education has been fostered are chiefly the large ones in London. It may be of interest to group these hospitals in accordance with the periods in which they were founded. In the twelfth century, St. Bartholomew's; in the sixteenth, St. Thomas's; in the eighteenth, Westminster, Guy's, St. George's, the London, and the Middlesex; and in the nineteenth, Charing Cross, King's College, University College, St. Mary's, and the Royal Free. All were and are dependent for their income on charitable contributions and bequests, and their resources have been well spent and carefully husbanded for the benefit of the sick poor—and, of late years, of those who, whilst not to be classed as poor, but who were totally unable to afford the expense of nursing and of skilled attention from a physician or surgeon. In return for medical services, hitherto given free, the governors of the charities have granted the medical officers the privilege of creating medical schools within the precincts of the charities and the use of the hospital wards for the training of students. It is not too much to say that the success of these great hospitals is largely due to that intimate association of the school with the hospital, which has acted as an intellectual stimulus to the hospital staffs. Medical education has not been subsidised, as has every other form of education, largely because medical men have been content with indirect rewards; and the latter are apt to be very unequally distributed. Most of us think of St. Bartholomew's and the other big hospitals in London first as medical schools, and secondly as hospitals, although they are maintained primarily for a hospital service for poor people. The need for such special fostering of medical education was so strongly impressed upon the teachers in the early Victorian days that it was held by them that the establishment under the suggested Poor-law Bills of large London hospitals alongside the charity hospitals to which were attached medical schools, would practically cripple the British system of medical education. Indeed the collective action of these teachers actually prevented the development of a new hospital service that, in the opinion of many, would have grown in the remaining portion of the nineteenth century into a magnificent organisation, providing not only London but also the rest of the country with adequate accommodation for the sick and injured.

Charity Hospitals Without Medical Schools.

In 1840 it was fully recognised that the support of charity was inadequate for the growing needs of hospital service; and from that date onwards the disparity between the supply of accommodation and the demand for it has steadily increased. Between 1860 and 1870 London was in dire need of additional hospital service, but the expense could not be faced. Before the war, in spite of the growth of existing hospitals, the creation of many small ones, and of innumerable cottage hospitals, the deficiency of provision was very evident. During the war attention was diverted from this question, but the public was educated, by force of circumstance, in the value of hospitals, by witnessing the rapid and successful treatment of injury and disease. The result is an appreciation on their part of the need for more accommodation to meet the increase in population.

If the resources of charity had begun to fail in 1840 and have not since been able to meet many of the demands made upon them, as is well known to the Poor-law and public health authorities, provision from that source is most unlikely to be forthcoming for the additions now contemplated. The Royal Commission in its recent report recommends a subsidy of £1,000,000 to clear some of the hospitals of debt, and further suggests a new mechanism for the collection of funds, but the Commissioners show no appreciation of the pressing need that exists for extension of our present hospitals and for the erection of new ones, nor do they differentiate between the great charity hospitals containing medical schools and those hospitals unhampered by the machinery of education. Hospitals with medical schools attached are exceptionally placed; upon them the entire fabric of medical education rests. They are entitled, therefore, to those privileges which all other educational institutions now enjoy in the matter of State support. The charity hospitals in London and throughout the country, used solely for the purpose of affording relief to the sick and injured, need no special consideration. When these institutions were founded the working classes were included amongst the poor. To-day they are as well off as, if not relatively better off, when in employment, than, any other class in the community, and it can scarcely be maintained that they require the help of charity to provide a medical service for them and their dependents. The guardians may to-day, as ever since the passing of the Poor Law Amendment Acts, make suitable provision for those few who are indigent in Poor-law or charity hospitals, being empowered to incur the necessary expenditure on their behalf. The hospital service of to-day is therefore kept up for the benefit of working classes, which everybody must rejoice to know are now in a position to provide a hospital service the like of which the world has never yet seen. These workers create industry, and the profits of industry are unobtainable without their help; they may justly claim that this service, perhaps the most essential for their welfare, shall be placed on a sound basis, and be supported in part by the industries they make a success.

The problems for immediate solution are: (1) the placing of the medical schools and their hospitals on a sound footing, and (2) the extension and modification of the existing hospital service to meet the needs of the working classes.

I do not propose to deal with the medical schools, for sooner or later the State, through the Education Department, must step in and place them in a position worthy of this country and of the magnificent system of medical education built up by and in great part at the expense of the teachers.

Hospitals for the Working Classes.

The first essential to the establishment of an extended hospital service is additional revenue. There is, of course, the money left in the name of charity, which the new hospitals would be entitled to claim, for the reason already given that the working classes until recent years were considered to be a poor and deserving section of the community. This money does not, perhaps, amount to more than £750,000 per annum for England and Wales. As the present cost of running our charity hospitals is over £1,000,000 per annum, nearly £3,500,000 would have to be provided from other

sources. To-day this sum is obtained in various ways, often at considerable monetary expense and by the employment of men and women who give their services voluntarily; no margin is afforded for the extension of hospitals, for more accommodation than exists to-day, or for new developments in the machinery for the cure of diseases; the amount is only enough to keep the hospitals going on their present basis. For these further objects money will be wanted; and it is time to enlist the support of the working class. During the past 50 years the status of the working man has undergone a profound change. At the beginning of this period he was rightly considered a poor man; he did not then earn enough to pay his weekly bills and leave a margin for contingencies. To-day he earns a good wage; he is supported during any sickness, and after 70 years of age is pensioned by the State. The working classes are now, I believe, in a position to say, "We can find it if you show us how and what benefit we shall obtain in return for our contributions." The following is an attempt to explain this benefit and the means by which it may be obtained.

Source of Revenue.

The present charity hospitals are, it is well known, more than adequate for the treatment of the really poor now that the working classes have risen from the lowest grade in society, and have acquired an independent and honourable position of their own. By coöperation they can, as I will show, share adequately with their employers in the maintenance of hospitals. There are about 13,000,000 men and women in our country who work for a weekly wage and are insured for definite purposes under the National Insurance Act. Moreover, under that Act is provided very economical machinery for the collection of contributions. If the same machinery were used any addition to the sum now collected by the Insurance Commissioners would involve a very slight and insignificant increase in the cost of collection. By a contribution of 1*d.* per week 13,000,000 men and women would provide £54,166 13*s.* 4*d.* weekly—that is, £3,066,666 13*s.* 4*d.* in one year. If to this is added 1*d.* per week by the employer from the industry for each employee twice the above sum would be available at the minimum cost of collection. This total of £6,133,333 6*s.* 8*d.*, together with the moneys now accruing from hospital charities, would amount to nearly £7,000,000 per annum, which sum the National Insurance Commissioners—the proper collecting body—would refund to each locality according to its needs. As the cost of the present hospitals is about £3,500,000 over and above that received from endowments the excess of money under the scheme could be put aside: (1) for the extension of existing hospitals; (2) for the re-erection of others in more suitable situations, or more commodious sites; and (3) for the establishment of new hospitals.

Consequential Changes.

The support of the hospitals by insured persons and by employers of labour, as above suggested, would be followed by many changes. The charity hospitals with their endowments would be absorbed by the new and reorganised institutions, and their mode of government would be modified to meet the new conditions. All service in them would, as a matter of course, cease to be merely voluntary. Apart from those who constitute the governing body, only the doctors at present render voluntary service. As, however, medical men are already appealing for payment for attention to sundry cases sent into the hospitals by public bodies, and are prepared to accept fees from payments made direct to the governing body by patients, the step I suggest is only a small one. Great advantages would, in the opinion of many, follow payment of the medical officers, as the time is at hand when work in the large hospitals should be undertaken only by those who devote their entire time to some specialty. Such work is too arduous and exacting for the man compelled to devote much time to other practice as a means of livelihood. The hospital doctor requires times for study, which, in the present condition of things, is very difficult to obtain; moreover, the medical student only receives such technical training in the methods for the discovery and for the curing of disease as will suffice to meet the requirements of examiners; newly qualified men, except in a very small proportion of cases, remain without opportunity to apply their book knowledge acquired with much labour and great expense. Again, the present system in the charity hospitals to which medical schools are not attached prevents the natural development of the machine for the proper treatment of patients; not until specialists only are employed can the work done in them be fully satisfactory. The recent progress of medicine and surgery makes it imperative for all specialists to have time for study and thought and to have their work apportioned and within their compass. The gain from this alteration would be immense if estimated only in the reduction of time an insured patient would take to become fit for the resumption of work.

Benefits.

But other benefits would be derived from a reorganisation of the hospital service on the new financial basis. Among them are relief of the home from the care of sickness and injuries, and a speeding up of the process of cure from immediate and proper attention and from the application of the appropriate means available in all large institutions but wanting in the home and seldom found in the smaller hospitals. In any scheme of reorganisation ample provision of beds must take precedence; a proper period of rest, combined with suitable employment, is essential to complete cure for the early resumption of work. To the injured workman the convalescent period is of extreme importance, and nowhere can this be ensured as fully as in graded hospital institutions designed for the purpose, arranged and equipped for the production of preliminary employment under healthful conditions. All dependants should be entitled to any advantages enjoyed by the heads of families: the houses of working men, necessarily of small size, would thus be relieved of all their sick and injured inhabitants greatly to the benefit of the rest of the family or occupants. Small-pox and other infectious diseases cannot be adequately isolated in such houses, which, moreover, are not large enough for maternity cases; it is therefore obvious that adequate provision for childbirth and after-care of mother and child would be necessary.

It will have to be recognised that the layman, however well acquainted with the business management of hospitals, is not the proper person to undertake the reorganisation of the hospital service. Such reorganisation must be the work of medical men who can grasp the problem as a whole. And those in charge of the finances should realise that it is not in the best interests of the patient that doctors should continue to render service on the old voluntary lines. We must break with the past, remodel the hospitals, and reorganise the professional work carried on in them, without losing sight of those sound fundamental principles under which the profession has won its present status. Whatever new hospital service might be devised the new conditions should embrace the following requirements: (1) The hospital medical service to come under the control of a sub-department, hospital service department, of the Ministry of Health; (2) appointments to be for life with the usual reservation as to behaviour, incompetency, &c.; (3) all payments on a whole-time basis; (4) promotion by merit combined with length of service; (5) translation, by direction of the sub-department of the Ministry of Health, as need arises for special services in different parts of the country.

The government of the hospitals would rest with the insured persons and employers; the State would represent the charities and thus exercise a measure of control. To ensure successful working the medical and surgical staff should hold office under a special body other than the governing body of the institution to which they are attached; otherwise the service would deteriorate, often very seriously, and in some instances would become almost worse than useless for reasons which need not here be stated.

Conclusion.

The scheme I have outlined is, I believe, the best available solution of the hospital problem confronting us to-day; I venture to think its adoption would lead to a quiet and very desirable revolution in the government, management, and usefulness of the hospitals. Money would be available for the development of matured and well thought out schemes and provisions of ample and immediate accommodation for sickness and injuries as soon as possible after their infliction. The result of speeding up the process of recovery would, I am satisfied, repay many times over the cost involved in the proper application of skilled doctoring, nursing, and convalescent training. Moreover, unification, in a general sense, of all hospitals and the creation of large institutions would lead to an economy impossible in the existing small and independent hospitals throughout the country. We need more for the money spent, and more cannot be obtained without reorganisation of the hospital service; from unification will result both economy in business management and better handling of disease and injury.

A CLINICAL THERMOMETER SHEATH.

Mr. A. E. James, head male nurse at St. John's Hill Infirmary, Battersea, has called our attention to the "James Thermometer Sheath" which he has devised. The sheath is a paper tube closed at one end, which is placed over the bulb and a portion of the stem of the clinical thermometer. When inserted into the patient's mouth the temperature is duly recorded, the thermometer withdrawn, and read. No cleansing is required, as the glass has not been in actual contact with the mouth. The sheath is ejected or removed by the patient. A further advantage is that, in the event

of accidental breakage of the thermometer in the mouth, the sheath will hold. There is nothing deleterious in the sheath, as rice paper, gum arabic, and paraffin wax only enter into its composition. Obviously the sheath must materially retard the correct recording of the temperature. Thus we found that an unprotected thermometer registered a rise in temperature from 73° to 100° F. in 18 seconds, the same instrument under similar conditions, but covered with a sheath, requiring 60 seconds. The inventor thinks the sheath should be found very useful to the busy physician passing from house to house during an epidemic. It would, however, be necessary first to determine that the retarded reading has no practical drawback.

UNIVERSITY TRAINING FOR WELFARE WORKERS.

THE Joint University Council for Social Studies, of which the object is the coördination and development of the work of university departments of social study, has issued its fourth report, entitled "University Training for Welfare Work in Industry and Commerce." Since the publication of the Council's report on welfare training in 1917 much experience has been gained on the subject, and in January, 1921, a committee was appointed further to consider the subject and prepare a revised report. The committee consisted of members of the Council and of other persons of special knowledge and experience; representatives were appointed to it from the Factory Department of the Home Office, the Ministry of Labour, Employers, Labour, the Welfare Workers' Institute, and the Industrial Welfare Society. Owing to the illness of Prof. E. J. Urwick, chairman of the Joint University Council, Prof. F. Tillyard (Birmingham) was appointed chairman of the committee.

In the introductory section of the report the development of industrial welfare work is traced from its beginning at the end of the nineteenth century to its present position. Its definition in the Home Office pamphlet of 1919 is quoted as follows in the section devoted to the scope of welfare work in the report: "the provision by the management for the workers of the best conditions of employment .... including everything which bears on the health, safety, and general well-being and efficiency of the worker, while avoiding any interference with his private affairs." It is pointed out that the minimum requirements of various Acts of Parliament constitute the basis of welfare work, but its logical development includes canteens, recreational and educational schemes, medical departments, employment departments, thrift societies, &c. An essential for the success of welfare supervision is the confidence and support of the workers.

The summary of recommendations is briefly as follows: 1. Training for welfare workers should be provided by the Universities. 2. While no fixed standard of qualifications for training for candidates for welfare work can be laid down, it is essential that candidates should have had such previous education as to enable them to profit by the social study course. 3. Graduates desiring to qualify for welfare work should supplement their degree courses by specialised post-graduate study. 4. No definite age can be fixed for commencing welfare training, but a certain degree of maturity of thought and experience is essential. 5. While the length of training differs according to the previous qualifications of the student, two years is, as a rule, the shortest period necessary to cover both the academic training and the supervised practical work. 6. Candidates for welfare training should receive the customary training for social workers, with certain options in the second year. 7. The syllabus should include some treatment of the following subjects: industrial and social history, economics, social and political philosophy, health and hygiene, psychology, outlines of central and local government, elementary statistics, industrial law, business organisation, industrial structure and problems. 8. Students should have lectures and personal tuition by persons who have had welfare experience. 9. While regular work in a well-organised welfare department for an extended period forms an essential part of practical training, all students should have opportunities of practical experience which will give them an insight into the working of the public and social agencies of a modern community, and opportunities of association with normal conditions of working-class life. 10. Scientific study of the problems of industrial welfare being still in its infancy, facilities for advanced study of such subjects as industrial organisation, psychology, statistics, &c., should be provided at convenient hours with a moderate fee. 11. Students who satisfy the examiners in theoretical and practical work should receive the usual Social Study certificate or diploma, with a special endorsement as regards welfare work. 12. Bursaries should be provided in order that candidates without means should not be excluded from qualifying for welfare work.

The final recommendation is for the establishment of joint advisory councils composed of representatives of both employers and workers, as well as of welfare societies, in connexion with each university.

GAS DISEASE IN FISH.

THE great mortality, due to various causes, frequently caused in very hot summers in fish-breeding establishments is well known, and the mortality among fish from want of oxygen is very common in summer. It appears, however, that super-saturation of the water with oxygen may be a danger to fish life. The *Fishing Gazette* for August 27th directs attention to a condition occurring in fishes known in German as Gaskrankheit der Fische, and described by Prof. Marianne Plehn, of the Biological Experimental Institute of Munich. In ponds rich in plant life, especially those that contain a large amount of algæ, at times there is an enormous liberation of oxygen and the water becomes super-saturated therewith. A slight super-saturation is harmless to fish, but when it becomes considerable they suffer. More oxygen is taken up by the blood, and if a rise of temperature takes place the oxygen separates from the blood in the form of small bubbles, which may injure the gill vessels or may collect in the heart and so form a "gas embolism," which may cause death almost immediately. The gas bubbles may occur in the peripheral cutaneous blood-vessels and are easily seen in the fins; larger bubbles collect in the vessels of the head, in the mucous membrane by the mouth below the eyes, and with preference in the orbital cavities, so that the eyes may be made to protrude. If the fish is removed to cooler water the phenomenon disappears and it may quite recover. But if the blood is super-saturated with oxygen a fatal gas embolism may occur if the temperature rises. These observations seem to explain a phenomenon, noted by fish breeders, that a rich growth of algæ is injurious to the fry, and it is not improbable that the trouble is caused by an excess of oxygen. Other gases than oxygen may be absorbed from the water and be set free in the blood stream when the temperature rises or the pressure falls. Everyone is familiar with the discharge of nitrogen in the form of bubbles that may occur in too rapid decompression of a person who has been working in a caisson, sometimes with very serious or even with fatal results from gas emboli. Fish in water super-saturated with ordinary air under high pressure show the gas disease, but the gas bubbles liberated are chiefly nitrogen, which, however, are equally dangerous to life.

THE USE OF X RAYS IN OBSTETRICS.

ATTENTION was drawn in a recent issue of THE LANCET to the possible uses of X rays in ascertaining the position of the fœtus during pregnancy. An article in the August number of the *American Journal of Clinical Medicine*[1] exposes a further use of X rays in obstetrics—namely, in determining the various pelvic measurements with precision and without any inconvenience to the patient. The principle upon which this method depends is of course that the height of any object may be determined by a comparison of its shadow with that of another object of known length. The article cited consists of an illustrated description of the technique.

THE "BLACK PERIL" IN U.S.A.

STATISTICS of the Metropolitan Life Insurance Co. of New York show that the coloured population of the United States increased at a lesser rate during the last decade than ever before. The increase was in fact only 6·5 per cent. during the last ten years. While the birth-rate has remained stationary or thereabouts, the death-rate has been rising and has in some areas even doubled. The death-rate from tuberculosis among adolescent negro boys and girls is ten times as high as among whites of the same ages. Malaria, typhoid, and hookworm infection take a high toll in the Southern States, while syphilis does enormous damage among the coloured people. Among negro males between the ages of 15 and 35 years the homicide rate is approximately ten times that of whites.

A SIMPLE METHOD OF FIXING FINGER-PRINTS.

To the second (Sept.) issue of *Dactylography*, a bi-monthly journal, edited by Dr. Henry Faulds, dealing with identification by finger-prints, Mr. Leslie D. White has contributed an easy method of making finger-prints which he accidentally discovered while experimenting in photography. Expose a piece of self-toning printing-out-paper to the daylight until it becomes almost black, impress the finger on it for three seconds, and immerse the paper in a solution of potassium permanganate, when immediately the finger-print shows up black on a white background. Wash in water for two seconds, place in the usual hyposulphite of soda solution for half a minute, wash in water, and hang up to dry. The result is clear and permanent, and bears magnification. Mr. White claims as an advantage that the method does not soil the fingers, and there is no ink to clog the skin markings. Dr. Faulds adds a remark that the impressions look as if they would enlarge well for legal exhibits.

[1] Roentgen Pelvimetry, by Dr. Edward E. Brostrom, of Los Angeles, p. 525.

MILESTONES IN ANÆSTHESIA.

I. In A.D.1875 a student, just qualified, when he was dresser in the eye wards at Guy's, gave the deadly drug chloroform in a closed inhaler to a patient upon whom Higgens was to operate for cataract. He proceeded to do his part with the confidence of ignorance, and with absolutely no instruction except such as he had gathered from watching the house surgeons in the theatre. All went well, and only a little sickness followed.

II. In A.D. 1887 the same student, now sobered by practice, gave chloroform in a similar way for Lister to perform a serious operation. That great and kind man instructed him in the better method of placing as much of the corner of a stiff towel as would cover the patient's nose and mouth, telling him to keep that surface gently wetted the whole time, with excellent result. Only the usual, or "laudable," vomiting followed.

III. In A.D. 1921 the same man, spectator and no longer practitioner, witnessed the administration of ether to his wife for the extraction of a difficult tooth. The excellent young anæsthetist used a Clover, holding it an inch away from the mouth, and gradually bringing it closer until quiet induction was complete, prepared to give ether on a flannel mask if it were needed. All went well of course; no vomiting, discomfort, or danger occurred, and directly afterwards the patient was talking clearly.

Perhaps these advances in 46 years are worth noting.

SEPTUAGENARIAN M.D.

SANITATION IN BENGAL.

IN the fifty-second annual report on Sanitation in Bengal in 1919, recently issued, Dr. Charles A. Bentley, Sanitary Commissioner, states that the vital statistics are calculated on a population of 45,329,247, being that of the Presidency according to the census of 1911, excluding the Chittagong Hill Tracts. The birth-rate was 27·5 per 1000, compared with 32·9 in 1918, and 33·3 in the quinquennium (1914–18); it was the lowest recorded since 1892, due to unfavourable economic conditions resulting from the poor harvest of 1918, and a serious prevalence of influenza, with excessive mortality, during the latter half of that year and the earlier months of 1919. In the various districts it ranged from 18·5 in Calcutta and 21·0 in Jessore to 32·8 in Rajahahi and in Noakhali. With regard to the rates in towns, it is stated that the "abnormally low birth-rates are due solely to neglect to register the births that actually occur." Presumably the same observation might apply to rural areas, of which 37 returned birth-rates below 20 per 1000; but this explanation would be at variance with the attribution of a low birth-rate to a poor harvest and influenza.

The general death-rate was 36·2 per 1000, compared with 38·1 in 1918 and 31·2 in the preceding quinquennium. Of the total number of deaths (1,641,111), no less than 1,229,257 are returned under the head of "fevers" (27·1 per 1000); this mortality was specially heavy during the first six months of the year, and was undoubtedly due to influenza; in the latter part of 1918 some 350,000 to 400,000 deaths may be ascribed to this cause, and in 1919 a further 200,000; Birbhum and Burdwan districts suffered most, with a probable loss of about 3 per cent. of their population during the last two years.

An Epidemic of Cholera.

Cholera was epidemic throughout the province—namely, in 494 out of 498 registration areas. The deaths reported (124,949) were in a ratio of 2·8 per 1000, compared with 1·8 in the preceding quinquennium. Only once in the last ten years has this ratio been exceeded. In the district of Birbhum the ratio was 6·8, and in that of the 24 Parganas 5·9, where the deaths from this cause numbered 14,360, this being the largest number reported from any individual registration area. Dr. Bentley remarks that "the October rainfall of 1918, on which the normal outturn of the winter rice crop depends, was much smaller than usual. The early cessation of the rains which occurred, especially in the Burdwan and Presidency divisions, reduced the supply of water available during the succeeding months. The deficient rainfall and short harvest also led to increased migration. Thus the factors necessary for the occurrence of widespread epidemics of cholera in 1919 were provided by the unfavourable season of 1918, with the results that have been recorded." The outbreak among pilgrims returning to Calcutta from the native festival on the island of Sagar at the mouth of the Ganges, when a large number of cases of cholera were landed in the city (Dr. Bentley states the number to have been "some 217"), and the energetic and successful manner in which this emergency (to which the epithet "appalling" may be fitly applied) was dealt with, have been already alluded to in these columns.[1] Dr. Bentley considers that a considerable proportion of the excess cholera mortality in the succeeding months was indirectly due to infection originally brought from Sagar island. In several instances during the year outbreaks in the province were traced to polluted water, but increasing use is being made of permanganate of potash and chloride of lime for disinfecting wells and tanks.

[1] THE LANCET, 1921, i., 307.

Small-pox, Plague, Rabies.

There was a great increase in small-pox, the deaths numbering 37,010 in 1919, giving a ratio of 0·8 per 1000, compared with 0·2 in 1918 and 0·3 in the quinquennium, 1914–18; the vaccinations increased from 1,619,280 in 1918 to 2,216,812 (if the figures are to be relied on, which Dr. Bentley considers to be doubtful). The deaths from plague numbered 424 (0·01 per 1000); 334 of these deaths occurred in Calcutta (0·4 per 1000). There were 179 deaths from rabies during 1919, compared with 119 in 1918 and 71 in 1917; the increased mortality emphasises the need for a Pasteur Institute (at Calcutta), more accessible than those at Kasauli and Shillong.

The work falling upon the Sanitary Commissioner has greatly increased in recent years, and a special committee is considering the matter with a view to improved organisation. It may be noted that the population of Bengal is approximately the same as that of the United Kingdom.

INDIAN JAIL OCCUPATION.

IN the Administration Report of the Jails of the Bengal Presidency for 1920 Lieut.-Colonel F. S. C. Thompson, I.M.S., the inspector-general of prisons for the Presidency, gives an interesting note on the diet of prisoners. The proportion of prisoners voluntarily choosing wheat at one meal in lieu of rice is steadily increasing. The beneficial result of this nutritious diet is evident from the fact that cases of bowel complaints have gone down considerably, and of the 32,175 convicts discharged during the year 54 per cent. gained weight, while only 19 per cent. lost weight. The daily average strength for the year was 15,357, the number admitted to hospital 20,254, and the daily average number of sick 812, against 15,886, 22,699, and 878 respectively in the previous year. The total number of deaths during the year was 321, against 365 in 1919. The commonest cause of mortality at the two most unhealthy jails, Malda (death-rate 78·8) and Jalpaiguri (69·2), was malaria, while dysentery proved the main reason at the next two jails, Burdwan and Faridpur, although malaria remained the chief cause of sickness. The industries pursued by the prisoners in the various jails include the manufacture of jute, iron goods, the printing and supply of forms, the manufacture of cloths and blankets, and of lubricating and medicinal castor oil and of mustard oil. In the juvenile jail the most important industry is the manufacture of quinine tablets. On an average 83 boys were employed on this industry and 13,195 lb. of quinine sulphate were converted into treatments and tablets during the year. 1,074,321 treatment tubes (each containing 20 four-grain tablets), 712,520 five-grain tablets, and 50,875 two-grain tablets were sold during the year. This jail also acts as a distributor of cinchona products. The total profits of the jail from the quinine industry and other manufactures amounted to Rs.233,561, against Rs.230,022 in the previous year.

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